QUARTERLY REPORT FOR THE PERIOD
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I. Central America Project Development

Building on the two previous trips to Central America last year, IPI and its partner Tennessee Valley Infrastructure Group (TVIG) have focused their attention this quarter on project sites in Honduras. TVIG’s unit—an Integrated Infrastructure Platform or IIP—combines water and electricity production in a single integrated unit, thereby providing both products at a lower cost than could be attained for each one separately. Because of the unmet demand for clean drinking water and electricity in remote towns throughout the developing world, the need for such units is widespread. Previous visits to Honduras have resulted in strong in-country commercial interest, support in the form of memorandums of understanding by key government agencies, and identification of four prospective project sites for IIP installations.

From March 5 to March 15 and with IPI support and participation, representatives from the TVIG, Tennessee Valley Authority (TVA), IPI, and market research firm International Business Initiatives (IBI) conducted an intensive survey of project opportunities in the four communities, to establish how IIPs might help these four communities enhance their economic development. A key aspect of the projects examined is the need to make them economically self-supporting so that they will be viable in the private sector.

Summary of specific project site studies follow here, and feasibility studies for the four sites are included as attachments.

A. Cantarranas

Cantarranas is a small community where drinking water, electric service, and sewage treatment are inadequate, even though it is only 70 km. from Tegucigalpa. The team met the mayor, community leaders, and the manager and engineers at the local sugar mill (the major industry in town); and surveyed virtually all of the businesses in town with a team of 8 Honduran interviewers. Findings included the following:

- Electric power suffers from frequent outages, which render businesses that depend on electricity less viable.
- The sugar mill supplies its own electricity during the half of the year when it processes sugar.
- The only safe drinking water is bottled water from Tegucigalpa.
- The road from Tegucigalpa to Cantarranas is presently in terrible condition, partly as a result of hurricane Mitch.
- Sewage is dumped with minimal treatment into a local stream, or into crude, poorly designed septic systems.
Several opportunities were identified for more careful evaluation:

- The use of TVIG’s cogeneration process to supply electricity and drinking water locally. The economics depend on the size of the bottled drinking water market, changing rules for the Honduran electric company’s power purchase price, and whether a local private sector investor—who is interested in the soon-to-be deregulated power sector as a new business area—will find the prospect profitable.
- The application of TVA’s patented ReCip sewage processing system, which TVIG is offering as one of an integrated set of services. It uses easily constructed ponds that are smaller than those in conventional sewage treatment plants. Sites and raw materials were identified, and the economics depend on the municipality’s ability to develop the necessary funding for construction.
- Two potential hydroelectric sites were examined; one may be economic if prior uses of water for irrigation can be accommodated.

IPI’s objectives were met in this project, as:

- Power and power-related projects were identified and evaluated.
- U. S. firms, notably TVIG and TVA, expanded their awareness of opportunities and of market conditions in general within Cantarranas, and their relationship with key decision makers there. IPI provided much-needed Spanish language capability.
- As an educational skill-enhancing process, the mission clarified not only the ways in which new technology might be applied locally, but also institutional mechanisms, involving local businesses, by which the economics can be feasible. An investor exists who can carry out the project, but other prospective activities might absorb his attention.
- Advisory services involving technical and business issues were provided not only to the U. S. firms (TVIG, TVA and IBI), but also to the local entities in their consideration of options.

B. Trojes

Tied tenuously to the rest of Honduras by 70 km. of wretched road, Trojes is a small, isolated town on the Nicaraguan border. Findings include the following:

- Coffee production is the major prosperous economic activity, but high energy prices—for example for coffee drying—and difficult transportation have prevented coffee, other crop production and ranching from attaining their full potential.
- The water is agreed by all to be unacceptable, as it contains not only fecal material from cattle uphill from the intake but also lead, according to one informant.
- The water is frequently turned off, which results in higher illness rates during the rainy season when water pressure cannot keep soil contamination out of the distribution system.
• The electricity supply from Nicaragua is unreliable, and it is reported that the national electric company may provide a used diesel set to provide power. Fuel supply over the bad road will be a problem.

The same interview team visited Trojes to assess water and electricity needs, and a meeting with coffee growers on a Saturday morning revealed that the financial resources probably exist among them to finance a power-water project. However, even though the municipality operates its own electric distribution system (unique in all of Honduras, and only because the power comes through Nicaragua) operating power systems is not an activity that coffee growers are comfortable with.

Examination of three potential hydro sites also suggests that at least one might supply all of the town’s electricity needs. It is located so far away that the water could not be used for municipal water, and costs of electric transmission will be a factor in the plant’s economics. The other two, closer sites could provide a portion of the needed electricity. To assist in evaluating these hydro sites, guidance was provided on stream flow measurements to the municipal utility and to the owner of the hydroelectric site, who is also one of the coffee growers.

Finally, based on discussions with the Trojes coffee growers the possibility of drying coffee with waste heat is being investigated. This would make electricity cheaper and more reliable in Trojes, and would enable growers to dry their coffee locally rather than sending it 100 km. to Danli.

As in Cantarranas, IPI’s objectives were met in Trojes:

• Power and power-related water projects were identified and evaluated. Related to energy needs is the poorly maintained road that approaches Trojes.
• The three U. S. firms involved, TVA, TVIG, and IBI, expanded their awareness of opportunities and of market conditions in general within the municipality, and their relationship with key municipal and agricultural decision makers there. IPI provided much-needed Spanish capability.
• As a skill-enhancing process, the mission clarified not only the ways in which these new technologies might be applied in Trojes, but also institutional mechanisms such as municipal power generation or a cooperative, also involving local businesses, by which the economics can be feasible.
• IPI and other team members provided advisory services involving technical and business issues, potable water supply, wastewater, and hydroelectric site feasibility.

C. Utila

Utila is an island off Honduras’ north coast, where water is supplied by a overdrafted system of private and municipal wells, and where the national electric utility, ENEE, supplies electricity 18 hours per day with diesel sets on the island. Sewage is not treated, or flows mostly to private, crude septic systems. One concern is the effect of both oil and
sewage pollution on the coral reefs that supply the tourist attraction that is the island’s main source of income.

To supply their electricity needs from midnight to 6 am, hotels typically run their own diesel generators, creating a very inefficient use of fuel. For the other eighteen hours of the day, a quirk in Honduran law sets the electricity price on Utila way below the mainland price rather than above it as the actual cost suggests; for various reasons including fuel transport, the cost of diesel generated power on Utila is quite high. Observers expect this quirk of high costs and low prices to be changed in the upcoming privatization of the electricity sector. The present ENEE power plant is disgracefully ugly on the otherwise scenic waterfront, and everyone in town the team spoke with said that they would like some other arrangement for electricity. Discussions with business leaders elaborated on other options, including solar, the TVIG integrated electric-water supply design, improved sewage treatment options, and wind power.

As the only one of the four locations with a respectable wind resource and with what will be high costs of privatized power, Utila offers the prospect that wind power could make privatization economically feasible.

In the Utila activity, IPI’s four objectives were met as follows:

- Project opportunities were identified for joint water-electricity production, wind power, solar, vastly improved sewage treatment; and the economics and next steps necessary were discussed in a meeting with some of the major economic forces in town.
- IPI contributed to discussions covering the TVA and TVIG products, and offered implementation advice on wind and solar power.
- IPI and the team provided background and educational assistance to decision-makers in areas of electric power, solar and wind energy.
- The IPI team also provided advisory services to businesses, a possible principal investor, and the municipality on financial and technical issues.

D. El Paraiso

El Paraiso is a small community on the north coast (not to be confused with the Department of El Paraiso in southern Honduras), where a sophisticated investor already understands the electricity and water markets he wishes to supply. As such, the IPI/TVIG team supplied data this investor needs to make his decision, along with further information on what turns out to be an excellent hydroelectric site located near El Paraiso. IPI provided preliminary estimates of its potential, and provided technical background so that the site’s stream flow can be evaluated more precisely.

An IIP is still a potentially good investment in El Paraiso, but the feasibility study is less extensive because the market conditions for both water and electricity depend not on local economies but on the purchase price of electricity on the national grid and on conditions for the export market to which the water will be sent.
Follow-Up Visit to Utila

On a follow-up visit, TVIG Personnel traveled to Utila April 13 through April 18 and met with a number of prospective local investors, to determine their interest and requirements for participation. Findings will be folded into a full feasibility/business plan, which will include a more detailed treatment of the market, fuel contracts, permits and government agreements, staffing, profit and loss projections, financing, a wind resource study, etc. It is presently believed that funds for some of the feasibility/business plan can be obtained from local sources. Other sources are being sought for the balance.

As a result of the two trips, IPI and TVIG believe that the Utila project offers the best prospects for early implementation of the IIP, encompassing electricity (probably with a wind power component), potable water, and sewage treatment. These results are described in the Attachment.

II. Cote D’Ivoire Feasibility Study

TVIG, IPI, and the government of Cote D’Ivoire have identified a number of good project sites where the IIP could be installed. The most attractive of these is Koyékro, about 110 km northwest of Abidjan. Cote D’Ivoire and the region around Koyékro have strong economies but Koyékro has neither electric power, potable water, nor telephone service.

The next step is a feasibility study like those which have been carried out in Honduras. The joint proposal made by TVIG and IPI to the U. S. Trade and Development Agency still has not obtained final approval, since diplomatic and commercial relations between the U. S. and Cote D’Ivoire were placed on hold as a result of the coup d’etat in Cote d’Ivoire last December. It is expected that this hold will be lifted some time in the near future.

III. African Energy 2000 Conference

Planning for the conference, whose theme is “Electrification of Africa in the New Millennium”, continues between IPI and Pennwell, a major U. S. publishing company which is also the largest host company of energy conferences. This conference will be held in Accra, Ghana, August 29 and 30.

Topics of the sessions already scheduled include financing, opportunities for public-private partnerships, current status of electrification, status of energy projects, a round table on identifying and maximizing business opportunities, and another round table on public-private partnerships.

Speakers who have already accepted Pennwell’s and IPI’s invitation include:

- Dr. John Abu, Minister of Mines and Energy, Ghana
Other invitees include representatives from:

- African Development Bank
- ABB Energy Ventures
- Andersen Consulting
- ESKOM
- CMS Energy
- Cinergy Global Power
- ESB, Ireland
- YTL, Malasia
- Enron
- Kenya Power and Lighting Company

In addition, energy ministers have been invited from Cote d'Ivoire, Nigeria, Uganda, Gabon, Senegal, South Africa, Zambia, Kenya, Tanzania, Algeria, Ethiopia, Egypt, Mauritius, and Sierra Leone.

IV. New Deputy Director

IPI has hired a new Deputy Director, Dr. John Schaefer, to replace Dr. James Porter, who has been seriously ill. Dr. Schaefer has worked for the past nine years as a consultant in electric power and renewable energy, for domestic and international clients. A former Peace Corps Volunteer, he has worked extensively in Latin America. He previously managed research projects at the Electric Power Research Institute, and consulted for private and public entities in electric power planning and pricing. He holds degrees in engineering from M.I.T., and Stanford. His resume appears as Attachment 1.
Attachment 1

JOHN C. SCHAEFER
International Power Institute, Atlanta, Georgia

Mr. Schaefer’s experience in providing consulting service covers technical, economic, and strategic issues. His clients have included utilities, equipment and power plant developers, EPRI, the Minnesota legislature, the American Wind Energy Association, and the United Nations. His expertise covers large and small scale solar and wind, energy efficiency, electricity pricing and planning for utilities, and electric transportation.

Recent projects include:

- A review of lessons learned from photovoltaic systems installed with Utility PhotoVoltaic Group,
- Review of green pricing activities in the U. S. for EPRI,
- Feasibility studies for renewable power sources in Nevada, Minnesota, and Chile,
- Electric vehicle studies for Palo Alto Utilities and Norwegian Industrial Attaché,
- Two book chapters for Solar Cells and Their Applications,
- Marketing and strategic planning for two solar dish Stirling companies,
- Confounding electric service provider in California’s restructured electricity market, and
- Market surveys and evaluations of photovoltaic and wind power generation in utility distribution systems.

From 1985 until 1991, he managed EPRI’s wind and solar field test activities, where he evaluated successes and lessons learned in photovoltaic, wind, and solar thermal power generation. As Project Manager he initiated projects, formulated research needs, selected and managed contractors, managed budgets, and assured the quality of project results. He edited and published more than 20 technical reports, and presented results from this work at seminars, EPRI meetings, conferences, universities, and utilities.

For the ten years before joining EPRI he served as a consultant on power system planning, energy efficiency, and time-of-use electricity pricing. He testified before the California Public Utilities Commission on avoided costs and on utility impacts from load control and conservation.

Mr. Schaefer has taught engineering at Stanford University, at San Jose State University, and as a Peace Corps Volunteer at the University of El Salvador. He previously worked in power system engineering for the Cleveland Electric Illuminating Company and the Pacific Gas and Electric Company.

Mr. Schaefer holds a Ph. D. from Stanford and a B. S. from M. I. T., and is a registered professional engineer in California. He is fluent in Spanish and has worked in Peru, Chile, Brazil, Costa Rica, Bolivia, Mexico, Nicaragua, Guatemala, Venezuela, Saudi Arabia, and Jamaica.