ADB

POWERING THE POOR

Projects to increase access to clean energy for all

Asian Development Bank

Contents

Acknowledgements

This publication was conceived by Samuel Tumiwa, coordinated by Shaanti Kapila, and facilitated by the South and Southeast Asia Departments.

The publication was financed through the Energy for All Initiative regional technical assistance funded by the Government of the Netherlands.

Ian Gill wrote the stories and took the photographs.

Note: In this publication, "$" refers to US dollars.

Foreword

Energy fuels economic growth and poverty reduction. Reliable and efficient energy services underpin the expansion of economic and employment opportunities, the continuing progress in social development, and the sustained improvement in standards of living.

The Asian Development Bank (ADB) actively supports its developing member countries (DMCs) to develop and improve energy services. From 1990 to 2008, ADB has lent over $24.5 billion for energy projects, extending electricity and modern fuels to hundreds of millions of people in Asia and the Pacific.

The effort to increase access to energy must continue. Today, many of the poorest and most vulnerable communities in Asia and the Pacific still live without access to modern energy. Through its Energy for All Initiative, ADB is committed to helping achieve energy access for all people in the region. This commitment is in line with ADB's corporate strategy (Strategy 2020) focusing on inclusive growth, and is reaffirmed in ADB's 2009 Energy Policy.

We seek to work with other partners to identify and develop new approaches for extending access to modern energy to the many people—especially in poor and remote areas—who remain "off the grid." We are supporting the formation of a new regional partnership—the Energy for All Partnership—with the objective to expand access to energy to an additional 100 million people in Asia and the Pacific by 2015.

The past offers useful insights as we move forward toward the goal of universal access to affordable and reliable modern energy services. Indeed, there are valuable lessons to be learned from energy access investments in the past, including innovative projects that ADB has financed. In these pages, we present stories from six projects implemented in five countries. They illustrate the challenges of extending access to energy through nontraditional approaches. They underscore how simple innovations can overcome persistent energy poverty. They reveal the power of modern energy to transform lives and communities, often in unexpected ways. Together, these stories shed light on how access to energy could be extended to millions more people around the region by expanding and replicating similar approaches. We hope that the projects featured in this publication will provide useful guidance and inspiration to our ADB colleagues and other partners in the region.

Xianbin Yao
Director General
Regional and Sustainable Development Department

Powering the Poor

The shopping malls, office towers, and high-end apartments in the capitals of developing Asia and the Pacific mask the dark fact that, in the rural areas, almost a billion people in the region still do not have electricity. Most live in far corners beyond the reach of power grids. For such communities, off-grid and environmentally friendly solutions need to be found.

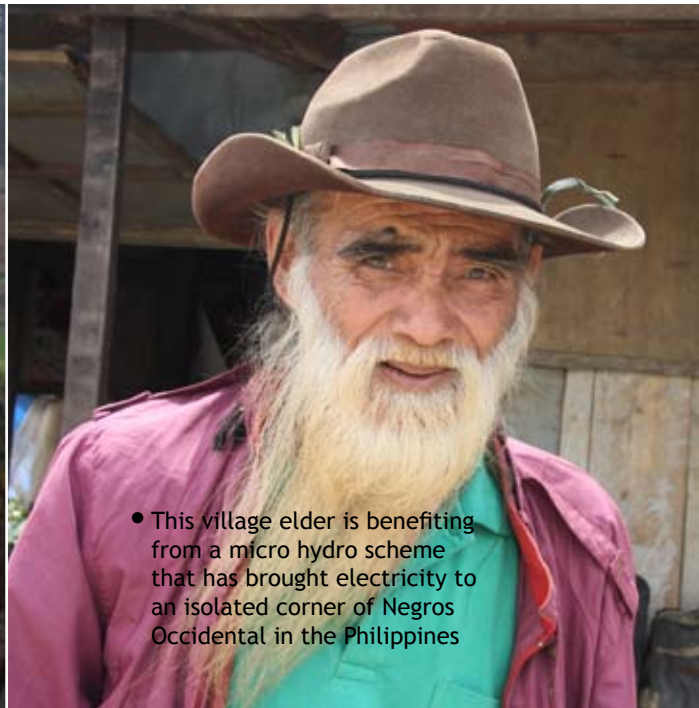
The stories in this volume—told through villagers and those helping them on the ground—portray resourceful ways of giving marginal communities access to clean and renewable energy.

The case studies look at different types of energy projects—solar, micro hydro and biogas—as well as innovative approaches in implementing and financing projects. We hope that governments might find some of these innovative solutions suitable for replication or upscaling in their country.

To be sure, the outcomes are exceptionally positive. As the villagers movingly attest, electricity has made lives safer and easier. In the forest or the mountains, an electric light offers protection against potential predators, human or animal. In Bhutan and Sri Lanka, for example, villagers report

Ingenious solutions are needed to bring access to energy to a billion people beyond the reach of power grids.

• In Bhutan, Nim Pem is one of several "barefoot warriors" bringing solar energy to remote villages



• This village elder is benefiting from a micro hydro scheme that has brought electricity to an isolated corner of Negros Occidental in the Philippines

that snakes—often venomous—left their homes after electricity was installed.

Among major health benefits, electricity enables mothers and midwives to deliver babies at home more easily. Cooking with cleaner fuel also reduces the risk of respiratory disease caused by the smoke of kerosene, wood, or straw. Health clinics operate more efficiently with electric light than with torches.

Overwhelmingly, villagers report significant savings in money and time when they no longer have to search for firewood or wood resin or travel to the nearest town to buy costlier kerosene.

Electricity eases a hardscrabble life by allowing men to use solar-powered lanterns to find straying animals, women to cook and clean, and children to study or play after dark.

Through television, cell phones, and even computers, electricity increases connectivity, bringing marginal communities into the mainstream with information and entertainment.

Significantly, too, power enables villagers to engage in income-earning activities to augment a subsistence living from the land. Women tell of making candles in Bhutan or conical hats in Viet Nam.

Providing remote communities with access to energy is no easy matter, however. The small size of the communities and their lack of access often make it uneconomic to include them in a power grid.

In the Himalayan Kingdom of Bhutan, where a visit to a settlement can involve a trek of up to 3 days, one answer is to provide solar panels that can be carried up mountains and across rivers by back. To take care of the technical issues, one project has trained village women as "barefoot engineers" who can assemble components as well as install and maintain panels. To instill ownership and ensure continuity, a system is in place for villagers to contribute to a fund for spare parts and to pay the homegrown engineers for repairs.

So far, the project has benefited slightly more than 500 households. With modifications, the approach could be expanded to cover more than 4,000 off-grid households and community institutions.

In the countryside of Negros Occidental in the Philippines, one project has installed a micro hydropower scheme in a river to transmit power to nearby villages. In another scheme, a ram pump, powered only by water pressure, carries water from a river to irrigate the fields of a rice-growing settlement. In both cases, the

• This girl's elder sisters are going to college because a ram pump system is irrigating land in Tara village in the central Philippines

• In Viet Nam, vegetable grower Hoang Dang Phach will raise crop production after switching to biogas

community has taken over the operation and maintenance of these energy systems.

In Viet Nam, a biogas project sprang out of a need to meet growing environmental and health problems caused by the proliferation of untreated animal waste on small farms. The result: by using household plants that convert pig manure into clean gas and slurry (organic fertilizer), tens of thousands of small-scale farmers have lower health risks, reduced energy bills, and higher crop yields.

In examples of ways to improve service delivery to rural consumers, this publication looks at two projects in South Asia. With manpower and resources in short supply, the electricity authority in the state of Assam in India has found a novel way to improve customer services while increasing revenues and cutting power losses. It has outsourced the running of rural networks to business-oriented, community-based franchisees who take better care of grassroots consumers and improve billing and collection services.

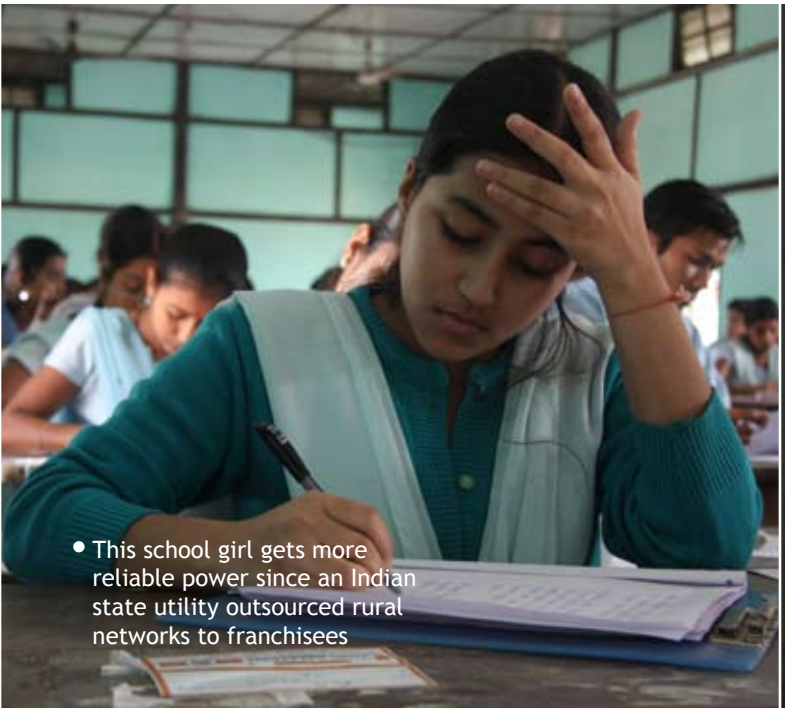
In Sri Lanka, many poor households are within a power grid but cannot afford the costs of wiring their home and connecting to the grid. A pilot microfinance scheme has enabled nearly 15,000 households to take out small loans to pay for these costs and make repayments in affordable installments. This project, too, is now being refined and expanded.

In poor communities, the financial sustainability of projects can be a major challenge. In these case studies, ADB provided the capital outlay—through a grant or loan—to get the projects off the ground. Some were financed from ADB's Japan Fund for Poverty Reduction, set up specifically to explore innovative methods of fighting poverty.

Once initiated, however, the projects are managed and maintained by communities motivated by gains in quality of life, income generation, and sense of empowerment.

Electricity has not, traditionally, been as high on the list of poor people's priorities as shelter, safe water, or other health safeguards. But it enhances life in so many ways that it quickly becomes essential. Once a family has electricity, it doesn't want to lose it.

As developing countries seek to provide universal electrification in the coming decades, they will need ingenious ways—which are economically and technically feasible—to help marginalized communities and hard-to-reach areas. This publication aims to help them find such solutions. ■



• This school girl gets more reliable power since an Indian state utility outsourced rural networks to franchisees

• In Sri Lanka, a mother and child live in a community where small loans are available to connect to the grid

In the struggle to acquire technical skills, the women had to overcome a language barrier as well as an unfamiliar diet and hot climate.

Women Become "Solar Warriors"

Semi-literate women are pioneering a community-based approach to provide remote villages with solar-powered lighting.

Engineer Selden checks a solar panel in Jangbi: A shy woman with a sense of empowerment

JANGBI, BHUTAN: Not long ago, Selden was a typical teenager in rural Bhutan. Shy, and without much schooling, she knew little of the world outside Jangbi, a tiny settlement perched 1,350 meters above sea level and a 2-hour trek from the nearest road.

Today, after a 6-month course in India, she is an engineer who assembles photovoltaic panel components and installs and repairs solar systems. She is among 35 women—dubbed "solar warriors"—in the front line of a pilot community-based project to bring solar lighting to the furthest reaches of this Himalayan kingdom.

Last year, the women were chosen to take part in a Rural Electricians Training Program, financed by a $1 million grant from ADB's

• Barefoot engineer Pem Choden: Set up a workshop in Salamji village

Japan Fund for Poverty Reduction, and carried out by India's Barefoot College, an educational nongovernment organization (NGO) that promotes development of the poor by the poor.

Introducing a "bottom-up" approach in Bhutan, Barefoot College visited several dozen non-electrified villages over 3 months, explaining the project and inviting communities to choose candidates for training in India.

In the struggle to acquire technical skills at Barefoot College in Tilonia, Rajasthan, the Bhutanese women had to overcome a language barrier as well as an unfamiliar diet and a hot climate. The women also battled self-doubt. "I am not very educated and I wasn't sure I could do it," says Pem Choden, from the southern village of Tshangkha.

The result, however, confounded skeptics. Within 3 months of returning home, the "barefoot engineers" set up workshops in their villages and installed panels on the rooftops of 504 households in 46 villages covering 13 districts. They also rehabilitated units that had fallen into disrepair from an earlier scheme.

"I am astonished that these women, facing culture shock and without advantage of the written word, were able to learn something complicated and come back to do something very useful," says Chime P. Wangdi, director general of the Tarayana Foundation, a Bhutanese NGO that is interested in helping Barefoot College with the training. "The respect that these girls gained from their transformation is terrific."

The government is watching the project keenly. With modifications to make it more sustainable, the project could be mainstreamed and replicated, says Mewang Gyeltshen, head of the Renewable Energy Division of Bhutan's Department of Energy.

• Villagers and monks at Gogona village: Head man Jamyang Dorji (front) says solar power saves time and money

Hydropower drives 100% of Bhutan's electricity grid and is a major export to India. But some 4,000 households—representing about 400 villages—are in such isolated locations that the only economic solution is to provide them with off-grid power systems like solar home lighting and micro hydropower systems.

"Some of these villages are reachable only after a 3-day drive and a 3-day hard trek," says Gyeltshen. "The government supports solar programs, but lacks manpower and resources. We need grassroots NGOs to help implement and monitor projects in the least accessible areas—and to enhance a sense of ownership."

The issue has become more urgent since the new government, after the country's first democratic elections in March 2008, has decided to advance its target for electrification for all to 2013 from 2020.

Community ownership is key to the project and Barefoot College inked agreements with villages to make monthly contributions to a fund to buy spare parts, especially batteries, which need to be replaced every 3–5 years. Villagers also agreed to pay the engineers for repairs.

Beyond question, beneficiaries widely appreciate solar power. One major benefit is that the cleaner energy has replaced kerosene and wood resin, which produce smoke that damages lungs and blackens homes. "It's easier to keep the home clean as kerosene fumes made everything dirty," says Mon Maya Rai, a mother of eight in the village of Salamji, in the southern district of Dagana. "We even save on soap for washing clothes."

Fetching and carrying kerosene also consumed a lot of time. "It would almost take a day to walk down the mountain and climb up with five or six liters of kerosene,"

says Phuuntsho, a resident of Phumzor village, near Jangbi.

Farmers—mostly sharecroppers, paying part of their crop as rent—use solar-powered lanterns to find straying animals after dark. "Sometimes, a bull arrives in the middle of the night and starts a disturbance with one of my cows," says Lal Bahadur Rai, of Salamji, as he watches his son wield a plough behind a pair of bullocks. "I have to get up and take the bull back to where it belongs."

Lighting helps women to cook and children to study in the evenings. "Teachers grumble less about getting untidy and dirty homework done in sooty conditions," notes Tarayana's Chime.

Life has also become safer with solar power. "The midwife said it was much easier to deliver our son with solar light rather than a smelly kerosene lamp," says Shamdal Lal, whose wife delivered one of Salamji's first babies since solar power was installed in 2008.

The risk of getting bitten by snakes—some poisonous—has also dropped. "We used to find snakes in the home," says Sang Dorji, a Jangbi father of four young children. "But we haven't seen one since we have light at night."

At Jangbi's clinic, health worker Jambay Dorji says, "It's much easier treating people with cuts now that we have electricity—it's hard to hold a torch and stitch a wound at the same time."

By extending the work day beyond nightfall, electricity is also allowing women to make baskets, rope, and other items for domestic use or for sale. In Langthel district, Tarayana, under its own project, organized income-generating activities such as nettle-

"We would like enough solar energy to run computer labs in remote schools because our rural children are falling behind."

—Chime P. Wangdi
Director-General, Tarayana Foundation

• Two mothers talk at Salamji: Expectant mothers have found it easier and safer to give birth with solar-powered lighting

weaving or making candles and soap once solar lighting arrived in 2006.

Tshengdu Choden, of Beling village, joined a self-help group to weave place mats, runners, and towels out of nettles. At first, she wove in the evening after a day on the farm, but now that she can earn up to 30,000 ngultrum (Nu) ($610) in a good month, she is weaving full-time.

It is a similar story with a candle-making group in nearby Encholing. Rinchen Wangmo used to make candles after dark. But the activity has become profitable enough—some candles find a market in high-end hotels—that she and other women use their workshop during the day as well as at night.

Communications—a lifeline in inaccessible areas—have strengthened as solar power also charges cell phones and computers.

"We would like enough solar energy to run computer labs in remote schools because our rural children are falling further and further behind in this new information age," says Chime, with an eye to the future.

To be sure, the project has made a promising start in empowering communities, but concerns about its sustainability remain. One issue is that many of the first batch of engineers were younger women who might

• Health worker Jambay Dorji tends to a child at the clinic in Jangbi: Easier having electricity than using a torch

• Solar power enabled Rinchen Wangmo to take up candle making: Now she works during the day as well

• A child at Jangbi community school: More hours for reading at night

marry and move away from their villages. Three women in Salamji and Gogona, for example, married and became pregnant since completing the course.

Barefoot College had aimed to attract mature women who are anchored to their villages, but found it difficult to persuade such women to leave home for several months.

One solution would be to provide training locally. Tarayana is willing to share training with Barefoot College and has even earmarked a facility for this purpose. Training in the local language and reducing the stress of going abroad should also draw more settled candidates.

Financing is another challenge to long-term viability. Barefoot College had signed agreements with communities to contribute Nu50–Nu100 ($1–$2) a month to a fund to buy spare parts, including batteries. But such amounts are too low to ensure sustainability, according to Ilaria Caetani, an ADB social development specialist working on the project. “If people contributed at least what they had previously spent on kerosene, they would still be gaining if you count the time saved as well.”

Solar systems, though provided free under the ADB project, cost from Nu26,000 to Nu36,000 ($530 to $735). Batteries are also expensive, costing from Nu4,000 to Nu5,000 ($80 to $100).

In spite of the agreement, at least one community has stopped monthly contributions. Moreover, some families are not paying the solar warriors for repairs. “It makes me feel bad. My parents scold me when I do repairs without getting paid because they say there is work to be done at home,” says Nim Pem, a young engineer in Gogona, Wangdue District. Apart from not being paid, Nim says that she, like others, has not been told what to charge for spare parts.

One solution to the financing issue would be cost-sharing, says the Energy Department’s

• Tshengdu Choden started nettle-weaving in the evenings: Now she does it almost full-time

Gyeltshen, with the government shouldering 70% and villagers 30% to begin with. In addition, to strengthen community involvement, he suggests enhancing the professional capacities of the government's district engineers, who might then liaise with village representatives to make the services more responsive to the changing needs of rural people.

To augment the income of the barefoot engineers, whose work is part-time, Gyeltshen says they could branch out into other activities and become commercially viable general service providers.

Resolving such issues is challenging in a country where physical access can be difficult and manpower and capacity are in short supply.

In the end, success will depend on the villagers and how much they value their new resource. To be sure, the incentive is strong. As one analyst observes, "Once people get electricity, they don't want to lose it." ■

• A government official uses a cellphone at Trongsa: A vital communications link for isolated communities

Micro Hydro Lights Up a Village

An innovative scheme in a far corner of Negros Occidental has cut energy costs and engendered a new community spirit.

BALEA, NEGROS OCCIDENTAL: When residents of Balea, a remote hamlet without electricity in the hills of Negros Occidental, were asked if they wanted their own power system, they were skeptical.

They weren't swayed by the fact that a micro hydropower system would be installed for free—funded under a $1.5 million grant from ADB's Japan Fund for Poverty Reduction. Nor were they impressed that the power they would receive would be cheaper than the kerosene they used or the electricity charges of power grids.

"People were hesitant and even the community leaders were asking so many questions," recalls Mayette Gersaniva, a community organizer tasked with mobilizing support for the project. "The people didn't believe the project was genuine. They thought we were using it to make money at their expense. Some even thought, especially when we were doing the surveying, that we were looking for hidden treasure."

That was in 2005. Four years later, the residents of Balea own and manage a 7.6 million pesos (P) ($170,000) micro hydropower system that not only makes life easier but has also created a community spirit.

Allen Pascual

• The micro hydro unit: Plans to extend transmission lines to another village

The hydro system temporarily diverts water from a nearby river to turn a generator and produce up to 32 kilowatts of electricity before returning the water to the river. The scheme is part of an innovative "RENEW Negros" project to provide renewable

• Balea Falls on Lat-Ason Creek: Source of energy for a micro hydro scheme

Bookkeeper Dodie Patubay (left) and other members of the cooperative: Pride and a sense of ownership

"The biggest challenge was to enlist support from a community that was accustomed to life without electricity."

Jim Orprecio
Project Director

energy to isolated villages that lack access to the electricity grid. The project also has a revolving fund that provides small loans to help increase villagers' livelihoods.

In Balea, the most important outcome may come from the community's experience of working for a shared goal. "Before the project, people concentrated on surviving and did not have much time for each other," says Gersaniva. "But they came together for training in all aspects of managing the project. Now they have more *pakialam* (social responsibility) and are more sociable. People use occasions like birthdays to throw a party and invite everyone."

The project is significant because, if proven financially sustainable, it could be replicated and scaled up in other isolated areas with appropriate hydropower conditions. It also represents an example of the private and public sectors working together.

The biggest challenge was to enlist support from a community that was long accustomed to life without electricity. "Electricity is not a top priority among the rural poor," says Jim Orprecio, project director for Winrock International, a nonprofit rural development agency that is implementing the scheme. "Rural people attach more importance to

• A rice mill that runs on hydropower: A cooperative venture that could be profitable

food or health or children's education. They buy kerosene, battery-powered torches, or candles only if they have extra income."

Despite this, at an orientation meeting attended by residents of Balea and two other *sitios* (hamlets), many understood, that the opportunities offered by the project far outweighed the costs. Over 40 households signed up to join cooperatives that would run the project. Others followed as leaders were elected, committees formed, and training programs organized on topics such as leadership, financial management, and policy formulation.

Several people received technical training and are operating the power house that lies 3 kilometers from the village at the base of the Lat-Ason Falls within the *barangay* (district) of Laga-an, Calatrava.

Nearly two thirds of Balea's residents—41 out of 67 households—are members of a cooperative that runs the generating unit as well as the transmission and distribution system that carries power to individual households. After fees to join the cooperative and a one-time connection charge (financed through a loan provided by the project), members pay a flat rate of P5.60 ($0.12) per kilowatt-hour, less than the nearly P7 ($0.15) charged by the agencies that operate the national grid. A flat rate of P50 ($1.07) is charged for those who consume 10 kilowatts or less a month—enough to power a light bulb or two. But the average member pays from P100

As evening falls, Balea turns into a much livelier place than it was a year earlier.

• Josefa Mahinay with kerosene lamps that preceded electricity: A potential danger if they fall

($2.14) to P150 ($3.21) a month, says the cooperative's bookkeeper, Dodie Patubay.

By late February 2009—8 months after the project became operational—it became apparent that groups as well as individuals were benefiting.

In this rice-and-corn growing region, one cooperative project is a P307,000 ($6,578) rice mill—using funds borrowed under the project's credit component—that started in November 2008. The mill, which removes husks and bran from *palay* (unmilled rice), has the capacity to process 18 sacks (800 kilograms) a day. By charging P1.50 ($0.03) per kilogram, it could become fairly profitable. To fully utililize the mill, the cooperative proposes borrowing P600,000 ($12,857) for an enterprise to purchase *palay*, process it, and sell white rice. The plan includes buying a second-hand truck for collection and distribution.

Electricity has brought big savings for some. "Our electricity is much cheaper

• Balea children attend this nearby school: Parents need to monitor TV-watching

than using kerosene," says Balea's biggest individual consumer, Vicente Maquiller, who runs several enterprises as well as growing rice and sugar cane. Even with his relatively heavy use, Maquiller, who is also chairperson of the cooperative, reckons his monthly electricity bill averages only P600 ($12.86).

As evening falls, Balea turns into a much livelier place than it was a year earlier. There is singing in the village's first karaoke bar, which opened 2 months after electricity arrived. This is a venture of Jessette Calandingan, who also runs a *sari-sari* (convenience) store next door. "I bought the village's first color television and karaoke equipment last July and lots of people started coming," she says. Sales at her store have risen from P100 to P300 ($2.14 to $6.43) a day to P500 to P1,000 ($10.71 to $21.43). A noted local entrepreneur, Calandingan used to operate a generator that supplied power to 10 households for 3 hours a day—but says it became unprofitable when the generator began needing repairs.

A few doors away, Daisy Maquiller, Vicente's wife, is serving a customer at one of Balea's three general stores. "We bought a refrigerator last December to serve cold beer for the first time," she says. As a result, the store has become a meeting place and stays open for longer hours. Villagers don't have to find their way home in the dark, either—the hamlet now boasts seven street lights.

"We bought a refrigerator last December to serve cold drinks for the first time."

Daisy Maquiller
Sari-sari store owner

• Rice and sugar cane farmer Vicente Maquiller: Fuel bill is much lower

• Community organizer Mayette Gersaniva sings at a karaoke session: Power scheme has brought villagers together

Children are better able to do homework with electric light rather than strain their eyes with a *kinky* (kerosene lamp), says Josefa Mahinay, demonstrating how lamps often have to be tilted to enable the wick to absorb more fuel. However, electricity has also brought a dozen or so televisions to Balea over the last few months and this could have an adverse impact on studying. "If children are watching more television, they may study less," says Nellie Gemida, a teacher at nearby Lagaan Elementary School, which Balea children attend. "Electricity mostly has a positive effect, but parents have to motivate the children to study."

Even the local pastor, Epifanio Cuizon, a Baptist, says he gains from electricity—he has started prayer and fellowship meetings in the evenings.

There are plans to extend power lines from Balea's hydro scheme to another *sitio*, Calapnusan, 3 kilometers away. Eager to participate, many Calapnusan residents have already paid to join the scheme. Moreover, Winrock has played a key role in negotiating with provincial and municipal authorities for funding towards the P2.4 million ($51,428) cost of the expansion. This underscores the importance of cooperation between private and public power entities.

The biggest headache facing the project was delays in implementation, often due to bureaucratic paperwork. "We needed to get all sorts of approvals. For example, the government had to approve the design for the power operation. We also needed to ensure that the installation of the system would not have a negative effect on the watershed and the environment," says Winrock's Orprecio. "Such delays led some people to wonder if the project would ever get off the ground."

These delays led to the project being extended for a year. Even so, the project is struggling to disburse loans through the

• A child of Balea: Reading is less strain on the eyes

revolving funds before it closes in July 2009. “One lesson we learned is that the disbursement system has to be up and running much earlier in the project cycle,” says Orprecio.

Overall, however, results so far indicate that the project is on track to achieving its main goals.

“I am happy and confident that the community can continue to manage the project once our work is finished,” says Gersaniva.

As Orprecio notes, “Balea and other *sitios* now have sustainable systems that bring them all the conveniences of electricity—and, importantly, they have pride and a sense of ownership because it’s their system.” ■

• Jessette Calandingan at the convenience store beside her karaoke room: Sales have jumped

TARA, NEGROS OCCIDENTAL: Little wonder that Erlinda Pronto wants more for her daughters than her hardscrabble life in Tara, an isolated *sitio* (hamlet) in the heart of sugar cane country, 85 kilometers south of the Negros Occidental capital of Bacolod.

At 48, and one of several children of tenant farmers, she knows well the cycle of seasonal employment, low income, and high indebtedness that trapped generations of farm workers. But she has also seen the start of diversification from a sugar-dominated economy into rice and corn and the slow shift from a feudal society inherited from a colonial era.

In the early 2000s, Erlinda and her husband Noel were among the 70% of the Tara Small Farmers Association that received small lots under the Philippine government's Comprehensive Agrarian Reform Program. From a half-acre lot beside the dirt track that is Tara's main road, they extract two rain-fed rice harvests a year to feed their family of five.

The big break for the Prontos—and the association—came with the installation of

Pumping Life into Land

A southern Negros Occidental community has improved crop and livestock production after receiving water from a nearby river through a ram pump.

• Willie Granada (left) and a cooperative member monitor the ram pump system: Water from the river is diverted into the collection tank (top left) and down to the pumps

a hydraulic ram pump in March 2004 that began piping water from the Bingig River that runs below the hamlet.

This extra irrigation water has enabled the Prontos to harvest a third crop of rice yearly, as well as grow vegetables like okra, string beans, and *malunggay* (moringa). Importantly, the income from selling the additional 60 cavans (3,000 kilograms) of rice—a net 37,000 pesos (P) ($792) after deducting P5,000 ($107) for expenses like fertilizer—has helped them give their children new opportunities.

"We use the vegetables to improve the children's diet and the rice income to send our older daughters to college," says Pronto. One daughter, 21, is due to graduate this year in law enforcement from Binalbagan College and the other, 18, is studying to be a teacher at West Visayas State University.

The Prontos are among 43 member households of the Tara association that agreed to take part in a RENEW Negros project, funded under a $1.5 million grant from ADB's Japan Fund for Poverty Reduction. The project, which closes in July 2009, has a dual purpose. One is to pilot renewable energy schemes with the hope of making them replicable elsewhere. The second, building on the work of

"We use vegetables to improve the children's diet and rice income to send our older daughters to colleges."

Erlinda Pronto
Farmer

• Erlinda Pronto and her husband Noel: More water provides an extra rice harvest every year

nongovernment organizations (NGOs) and churches, is to use a community-based approach to encourage self-reliance and a sense of empowerment in a region where lack of opportunity has engendered widespread poverty, dependency, and hopelessness.

Under the agreement with the Tara cooperative, RENEW Negros offered to install a ram pump system, sharing costs with the Alternative Indigenous Development Foundation (AIDFI), an NGO that promotes hydraulic pump systems, and the farmers, who would contribute labor by working for half-pay at P50 ($1.07) a day.

To ensure the pump system would last, Winrock International, a nonprofit NGO implementing the project, organized training for the farmers, not only to manage and maintain the system but also to improve skills such as financial management and livelihood development.

The ram pump system, devised over 200 years ago to raise water in a French paper mill, is an ingenious, simple, and inexpensive method of using the force of a large amount of water falling from a small height to lift a small amount of that water to a greater height.

At Tara, this involves using a weir to divert part of the Bingig River to a collection tank that is higher than the ram pump. From the tank, water flows by gravity to the pump system. It pushes open a valve to force air and a smaller amount of water, through another valve, up a pipe to a distribution tank on a hill. From there, water is fed to four subsidiary tanks and the lots of cooperative members. Using no power other than flowing water, the system is self-perpetuating. Since it uses few moving parts, it also requires little maintenance.

Although only 20% of Tara's 240 households are members of the farmers' cooperative,

• Jim Orprecio (left) and Rose Peruelo (third from left) in discussions with cooperative members Fely Talatala (second from left) and Willie Granada: The community manages and maintains the ram pump system

• Fely Talatala, vice chairman of the cooperative: One of the goals is increasing self-reliance

the project benefits the wider community. Over the past 5 years, it has transferred nearly 450,000 liters a day to Tara's lands and has significantly raised the groundwater level.

"With higher moisture content, the whole area becomes lusher, promoting better growth not only for plants but for animals like snails and insects which, in turn, are a source for animal feed," says Jim Orprecio, project director for Winrock International.

"Wells that were dry now have water," says Willie Granada, the 61-year-old former chairperson of the cooperative. "People used to take their *carabao* (water buffalo) to the river once a day for drinking, now they can do it in the village. It's a big help for the community."

Just over half of the cooperative members have gained directly from increased irrigation of their farm land, says Granada. His own rice production has jumped 80%, and he is producing new crops of *ampalaya* (bitter gourd), beans, eggplant, and papaya.

• A water buffalo by the Bingig River: A higher level of groundwater means some carabao can drink on village land

Even members whose farm lands lie beyond the system's current distribution network derive substantial gains. Ninfa Agenga, secretary of the association, has a well that is working again and a thriving piggery as a result of the extra water for her home garden. The well water is used for washing and, when boiled or chlorinated, is drinkable. Under a credit component of the project, she took out a small loan to start her piggery.

"Many families in Tara started piggeries as a result of the project," says Rose Peruelo, a livelihood officer employed by RENEW Negros to provide livelihood training. "They have discussed other activities but swine-raising has been the most popular."

Sitting in their dilapidated wooden center, members of the cooperative reflect on what they have achieved and debate the future.

Although the cooperative has P50,000 ($1,071.42) in savings from members' capital contributions, it is reluctant to invest in pipes to extend the water distribution network to some members' outlying farms.

Local politicians provided funds for some satellite distribution tanks—still unused—and this led the cooperative to hope the politicians will also help expand the 700-meter network of pipes. "This reflects the traditional dependency on politicians,

"Many families in Tara started piggeries as a result of the project."

Rose Peruelo
Livelihood Officer

• Feeding the pigs: River water has encouraged more members of the Tara cooperative to raise swine

• Members of the Tara Small Farmers' Association at a meeting: Irrigation water from the river has raised crop and livestock production

who make promises but don't always keep them," explains Orprecio.

On lessons learned, Orprecio says the Tara cooperative still needs strengthening in some aspects of community organization—for example, in becoming more self-reliant. One difficulty in this area was that, when RENEW Negros introduced the project, the Tara association was influenced by a church NGO that was wary of the new scheme.

"We had to go through the existing NGO to organize meetings and training programs and this caused delays," says Orprecio. "This meant that our community organizing work fell behind."

On the technical side, too, Orprecio says the distribution system could be improved, with more gate valves to optimize water use and ensure that water is directed more to areas where the need is greater.

"The Tara Cooperative needs strengthening in some aspects of community organization—for example, in becoming more self-reliant."

Jim Orprecio
Project Director

• Pigs eat better: Higher moisture content produces snails and insects

Despite such flaws, no one in Tara—or the five other *sitios* where RENEW Negros provided ram pumps—questions the benefits of increased water supply.

Demand for such systems remains strong despite the economic downturn, says Gilbert Quirido, an officer with AIDFI, the main fabricator of ram pumps in the Philippines. Based in Bacolod, the NGO provides a package that includes pre-project surveys and training programs.

After installing 20 ram pumps systems in 2008, AIDFI put in a further eight pumps in the first 2 months of 2009, says Quirido. Underscoring the replicability of the system, the NGO has installed ram pumps in other parts of Asia, including Afghanistan, and South America.

As well as raising productivity on small farms, the pumps are helping a new generation, like the Pronto children, to have more choice in how to lead their lives. ■

• Ninfa Agenga, secretary of the Tara cooperative: Has a piggery and a well that has water again

Boosting Biogas

By helping farmers convert animal waste into clean energy, an ADB project will improve health, cut fuel costs and raise crop production.

GIA BINH DISTRICT, BAC NINH PROVINCE, VIET NAM: Two neighboring farmers show how animal waste is contaminating Viet Nam's soil and water—and how the government is helping farmers tackle this problem.

For 30 years, Nguyen Duc Dam has been raising pigs at his home in Dong Cuu village, Bac Ninh province. The pigs' manure creates a stench and draws flies and mosquitoes. Some of the waste is disposed of through a pipe, which empties into a nearby communal pond. As a result of toxicity, fish have long vanished from the murky pool. "We used to eat fish from the water, but I haven't seen any fish around for several years," says Nguyen Thi Thanh, a young mother who lives beside the pond.

A short walk away, in contrast, Tran Van Dinh maintains two spotlessly clean pig sties by his house. There is neither smell nor flies. The reason: Dinh feeds the waste from his pigs into a biogas digester, a small underground plant that converts raw manure, through fermentation, into a clean gas and slurry. Dinh and his family use the gas for cooking and lighting—and the slurry to fertilize their rice and fruit crops.

Eight years ago, a complaint about the odor from a neighbor prompted Dinh to invest in a 5 million dong (D) ($280) household biogas unit. By using biogas instead of other fuels, Dinh reckons he saves as much as D500,000 ($28) a month.

Moreover, his wife, Vu Thi Huyen, no longer cooks with straw, which took time to gather, and which hurt her eyes with smoke. She uses the time saved to work on the farm or home or to make conical hats for sale. With electricity from a biogas-powered generator, daughter Huyen also has more time for homework.

Dam would like a biogas digester but, like most of Dong Cuu's 600 households, cannot afford one. These days, a household digester runs to between $520 and $550.

• Construction of biogas digester at Giap Ngo village: Small loans will help more farmers install one

• Health is top priority for Nguyen Duc Thuyen: His grandchildren and friends play outside

The issue of contamination has become more urgent as Viet Nam's livestock sector—of which pigs make up 80%—has been growing at around 14% for the past several years. Each year, an estimated 70 million tons of waste is composted or washed away through rivers or ponds.

"This contaminates groundwater, soil, and air and affects the quality and safety of agricultural products," says Nguyen Thanh Son, deputy director general of the Ministry of Agriculture and Rural Development's Livestock Production Department, which is implementing Viet Nam's biogas program.

"Raw manure contains parasites, bacteria, and salmonella that contaminate people and animals. The fermentation process destroys most of the pathogens," says Jeroen Kruisman, a senior adviser with SNV Netherlands Development Organisation, which has the helped the government develop the national biogas program since it began in 2003.

In addition, using clean biogas for cooking reduces the respiratory diseases caused by using smoky fuels such as wood or straw—in kitchens that are often poorly ventilated.

The SNV-supported national program built 60,000 biogas plants by the first quarter of 2009, and plans to add 106,000 by 2011-2012. If the target is achieved, the program will have reached at least 55 out of Viet Nam's 63 provinces.

"We had a few small-scale biogas projects in the 1990s, but SNV put our national program on a scientific and systematic basis," says Son. "The training and quality

The issue of contamination has become more urgent with rapid growth in the livestock sector.

• Pig breeder Tran Van Dinh: Odorless sty has stopped complaints

of the construction of the biogas units are very good."

Building on this, ADB approved a project in March 2009 that includes a $19 million component to provide credit to construct 16,000 biogas units by 2010—and 40,000 units by 2015—in 16 provinces. The assistance is part of a much larger loan to broadly improve the quality, quantity, and safety of commercial food crops as Viet Nam diversifies crop production and increases food exports.

According to a recent survey conducted by SNV, the credit component should boost the program significantly, as more than 80% of 260 households surveyed said that a shortage of capital was the biggest constraint in buying a biogas unit. Under the national program, SNV and the provincial governments provide a subsidy of D1.2 million ($68) per unit, or 13%-15% of the cost, but many farmers cannot afford the balance.

• A Dong Cuu piggery without biogas unit: Stench, flies, and mosquitoes

• Mason Do Hoang Anh Chau: Supervising construction of a biogas unit in Que Vo district

To handle the credit, ADB plans to use financial intermediaries with experience in the rural sector. The annual interest rate will be fixed at 55% of prevailing market rates—currently about 11%—says Son, who is also deputy director of the ADB project.

Significantly, the new project will not only expand the national biogas program to five new provinces, but will also upscale the biogas units. As well as providing household units, the ADB project will consider how to increase the size of biogas units to serve larger and more commercial end-users such as community projects and small and medium size enterprises, says Mahfuz Ahmed, the ADB principal natural resources economist who processed the project. This will include developing pilot demonstration units.

To be sure, the national program already has a sound foundation. The northern province of Bac Ninh, for example, constructed 4,538 biogas units from 2003 to the end of 2008. "We estimate each unit saves an average of D1.2 million ($68)

• Farmer's wife Nguyen Thi My: Won't have to bicycle to town to buy firewood

• Fish breeder Dang Viet Chuong: Pig manure provides nutrition for his pond

for each household per year that would otherwise have been spent on firewood, straw, coal, or kerosene," says Nghi Quang Toan, vice director of Bac Ninh Agriculture and Rural Development Department. By this calculation, the units built in the province are saving D5.4 billion ($306,450) a year, he adds.

"Besides this, the program uses slurry for fertilizer, which reduces environmental pollution; saves labor for women and children in finding and chopping wood; and, thirdly, it provides jobs for masons and construction workers," says Toan.

As elsewhere, activities in Bac Ninh include promoting the biogas program through television and various farmers', women's and youth groups, training masons and workers in building biogas systems, and teaching households to use and maintain the units.

In 2009, Bac Ninh plans to build 1,000 units—but still cannot keep up with demand. "We have a long waiting list," says Toan.

In Dong Cuu village, Nguyen Thi Vu got the idea of a biogas unit from a neighbor and borrowed, mostly from relatives, to buy one. She gets just enough gas to cook for her family and her livestock, but wishes she had enough gas to process rice wine, for which she still uses charcoal.

She says she found it easy to understand the instructions on operating and maintaining

Women save an average of 1.8 hours a day by using biogas, according to an SNV report.

• A field in Que Vong district: Slurry is an organic fertilizer that increases crop yields

• Mother Nguyen Thi Thanh: Hasn't seen fish in the pond for years

• Farmer Vu Thi Huyen: Biogas gives her more time to make hats

the system. Dong Cuu village comes under the purview of project technician Nguyen Hong Quang, who has been sensitizing families with awareness programs since 2003.

"With varying educational backgrounds, some families find the system hard to understand and others are unwilling to use biogas," says Quang. "But there has been increasing acceptance, shown in the growing number of units we have built."

Farmers have different priorities when choosing biogas. Health protection is the main reason cited by Nguyen Duc Thuyen, a 60-year-old farmer who used to have respiratory problems when he smoked. "Our living quarters and the piggery are close to each other and the flies and smell from the waste would be unbearable," he says, while watching his grandchildren play in his yard at Trai Duong village, Que Vo district.

• Nguyen Thi Vu making rice wine: Still uses charcoal but wishes she had enough biogas

Saving time is especially appreciated by women, who save an average of 1.8 hours a day by using biogas, according to a report, says SNV's Kruisman. "I have to go twice a month to a shop 5 kilometers away to get firewood for cooking and the round trip takes the whole morning," says Nguyen Thi My, who is having a unit constructed at her home in Giap Ngo village near Truc Son. My goes by bicycle, loading the firewood into a wire basket attached to the back. Her husband, Hoang Dang Phach, plans to use slurry to fertilize their nearby vegetable farm.

"Organic fertilizer can increase crop yields from 5% to 20%, compared to chemical-based fertilizers," says Kruisman.

In appropriate quantities, slurry can also be used for aquaculture. In nearby Luong Xa village, fish breeder Dang Viet Chuong says he puts all his slurry into a large pond where he grows carp, bream, and dory. "The fishpond is big enough to take all the slurry I give them," he says.

"This unique project has many win-win dimensions," notes ADB's Ahmed. "It started out as an environmental project to improve food and water safety. But it also deals with health and labor issues for women, for example."

On the environmental side, it is estimated that the installation of 40,000 biogas digesters under the ADB project will reduce CO_2 emissions by 40,000–60,000 tons a year. ADB is mulling developing Clean Development Mechanism projects to generate carbon-derived revenue.

Such ideas will become more feasible as Viet Nam, which has established the biogas model at the household level, readies to scale up the project for larger end-users. ■

Agents for Change

Private franchisees are managing electricity networks in rural Assam, India—and are bringing better service, bigger revenues, and a profit.

The state utility, with insufficient manpower to service thousands of scattered consumers, has outsourced the task.

• Agent Kumud Medhi talks to Nilima Baishya: Close links with the community

SUALKUCHI, ASSAM, INDIA: Tenant farmers Nilima Baishya and her husband, who eke out a living after giving half their crops to a landowner for rent, took advantage of a government offer to connect their home to the electricity grid free of charge in 2005.

With evenings illuminated for the first time, by four light bulbs, they have invested in two spinning looms to earn extra income from weaving. Their children can also study longer. “We used to go to bed early to reduce stumbling around at night,” says Nilima, who lives at Tokradia village,

• Planting rice in the dry season: Electricity-powered pump provides water

Hajo district, an hour's drive north of the Assamese capital of Guwahati. "We pay around 190 Indian rupees (Rs) ($4) a month for electricity, but this is much less than we paid for kerosene, which was sometimes hard to get."

Another neighborhood family decided to start a chicken-rearing enterprise when power supply to the village began improving 4 years ago. This business relies on electricity to power a large lamp that hangs over the chicks as they scurry around the coop. "The lamp provides warmth as well as light and the chicks are active when it is on, they eat and drink more," says Pramila Kalita, mother of the household, as she feeds the tiny birds. "If there is a power cut and it is dark, they hardly move."

In the nearby hamlet of Nampara, rice farmer Khagen Lahkar recently switched to using electricity instead of diesel for his irrigation pump that provides water during the long dry season. The extra water helps him grow three crops a year of rice and mustard seed. "My fuel bill has come down to nearly a third and I don't have to go

• Pramila Kalita distributes food: The chicks eat and drink more when the lamp is on

around looking for diesel anymore," he says.

These villagers in India's northeastern state of Assam are examples of thousands who are benefiting from better electricity supply and services since the Assam State Electricity Board (ASEB) appointed franchisees to manage rural networks on their behalf.

With insufficient manpower to service thousands of rural consumers scattered over an elongated area the size of Ireland, the state utility decided to outsource the task of managing and servicing networks to private agents.

These agents and their staff manage the distribution of power at the local 400-volt network level through a so-called single point power supply (SPPS) scheme.

Their job is to enhance the efficiency of the flow of power between transformers—the single points—and consumers by reducing huge system losses. They are also tasked with improving schemes for billing consumers and collecting revenues.

If it works well, this public–private partnership arrangement produces win-win outcomes for all parties: more revenue for the government, better service for the consumers, and profit for the entrepreneur.

ADB helped create an enabling environment for private sector involvement through its Assam Power Sector Development Program in 2003. Around the same time, ASEB began its public–private partnership distribution franchising scheme.

So far, ASEB has appointed 752 SPPS franchisees across the state in areas with

Their job is to enhance the flow of power between transformers and consumers by reducing huge system losses.

• Sualkuchi street: Improved electricity services since 2005

• Farmer Khagen Lahkar: Switched to electricity from diesel to irrigate his land

low or no operations and maintenance, irregular billing and revenue collection, and high technical and commercial losses. Their ambitious goal is to provide access to electricity for all. Currently, over 20% of Assam's 25,000 villages are without electricity and many of the rest receive power for a couple hours a day or less.

Clearly, the franchise model depends heavily on finding suitable agents. This is no easy task. Agents must have enough capital to pay a large security deposit to ASEB and, to be successful, must possess business and technical skills, and be trusted members of the community. Success also depends crucially on power generation in a state where peak demand greatly outstrips supply. As one franchisee notes, "We provide a service. If there is no power, there is no service."

One area where the model is working well is Sualkuchi, a semi-urban settlement known for its cottage weaving industry. In Sualkuchi, 35 kilometers northwest of Guwahati, ASEB manages distribution for over 40% of the 5,500-odd consumers but has farmed out 57% to three franchisees since 2005.

"An agent should be someone people trust and who can respond to their concerns."

Kumud Medhi
Head of Youth-Care

• Weaver Anita Das: Working till late at night for festivals

Within months, the agents achieved startling results. They reduced commercial and technical losses from 60% to 19%. Most commercial losses were caused by pilfering—rigging wires to bypass meters. Agents reconnected the meters and sealed them to prevent tampering. This brought commercial losses to almost zero. The franchisees also brought down technical losses—mainly through low-cost measures such as moving transformers to better locations, balancing distribution, and removing branches from wires—to an average of 13%.

Under ASEB, many consumers have to travel some distance to pay bills. As a result, many bills are paid late—if at all. In contrast, Sualkuchi agents, through their staff in the community, have increased billing efficiency to 81% from 47% and raised revenue collections by 214% since 2005.

Achieving these outcomes hasn't been easy, however. Some people physically resisted efforts to reconnect the meters. Other consumers call with complaints at all hours of the day and night. Agents handle such issues according to their personality. "We listen to their complaints nicely and this will satisfy them until we solve the problem," says Kumud Medhi, a mild-mannered agent whose father was a well-known teacher in the community.

In contrast, Mridul Bharali, who has a stern visage and whose father was a *mouzadar* (land revenue collector), runs his franchise with a stricter hand, not hesitating to disconnect those who cheat the system or fail to pay on time.

"It's an important part of our strategy to have agents who are part of the community," says Champak Barua, deputy general manager of the Lower Assam Electricity Distribution Company. "An agent should be someone people trust and who can respond to their concerns." Kumud, who heads the Youth-Care franchise, says integrity is another important attribute. "There are many loopholes for abuse for agents and their staff," he says.

Despite the challenges, Kumud, who manages networks in several communities, says he is interested to expand. The main obstacle, he says, is the capital required—agents need to place a security deposit equal to 2 months' bills with ASEB. In return, agents earn their money through buying power from the state at a 10% discount and receiving commissions on extra revenue.

Given the need for leaders with capital as well as financial and technical expertise, it is hardly surprising that Sualkuchi franchisees may be the exception rather than the rule. Many franchises south of the Brahmaputra—the mighty river that divides Assam—are not operating as well as those north of the river, says an ASEB official. He often encourages agents to consult and learn from their Sualkuchi counterparts.

Such agents would also be encouraged by enterprises, schools, and hospitals in and around Sualkuchi. In a weaving factory in Bangsor, Bina Sarania is among 20-plus weavers who often work long hours to produce silk garments, especially the traditional Assamese *mekhala* and *chadar*. "During the *Bihu* (harvest) festivals and *Durga Purga*, we work till late at night and we need light to operate the looms," she says.

At Sualkuchi College, principal Bilash Chandra Das says staff and pupils need reliable power in the science laboratories as well as to operate computers. "We also appreciate the fans when the temperature soars in summer," he adds.

The superintendent at Sualkuchi rural hospital, Dr. Kartik Ghandra Medhi, says uninterrupted power is important for neo-natal treatment, including photo-therapy for babies with jaundice, and for ultrasound procedures.

With such obvious benefits, Assam wants to extend the franchise model throughout the state. ADB plans to support a $1.1 billion project with a loan of up to $250 million, expected to be approved late in 2009. This project will increase Assam's generating

• Weaver Bina Sarania at Bangsor factory: Needs light when working at night

capacity by providing access to hydropower and natural gas outside the state, notes Len George, an ADB consultant in the field. It will also improve transmission and distribution systems.

As importantly, it will scale up the SPSS franchise in other rural areas. “This model benefits the poor and has shown it can be financially sustainable,” says Naoki Sakai, an ADB energy specialist (private sector participation). “The project will include training as well as hardware to expand the franchise system.”

By helping social services and generating income opportunities, greater access to electricity is sorely needed in a state where nearly half the population lives below the poverty line and half the educated youth are jobless. ■

• Injecting a child at Sualkuchi rural hospital: Power keeps vaccines at low temperature

• Schoolgirls at Nampara: Electricity helps with the homework at night

• Akalanka packages spices: An electric blender would save processing time and money

Credit to Connect

Sri Lanka is building upon a successful pilot project to provide loans for poor households to join the electricity grid.

HAMBANTOTA, SRI LANKA: Herath Ranjan makes a modest living fishing off the southern coastal district of Hambantota. But these days, he and his wife Ureka are also earning money from a small general store, income that has grown since they began receiving electricity.

Their big break came when, soon after they opened the roadside shop in front of their home, a power distribution line reached their neighborhood in Godawaya.

They wanted electricity, but could not afford the upfront cost to wire their premises and connect to the grid. So they took out a loan of 15,000 Sri Lanka rupees (SLRs) ($130) to cover most of these costs and have since been paying off the loan in affordable monthly installments.

With electricity, they installed a refrigerator—a gift from a sister abroad—in the shop. As a result, income from trading, spurred by sales of refrigerated products, is rising faster than from fishing. “Some of our best selling items are ice cream and cold drinks,” says Ureka. “We also use the fridge to store leftover fish and sell it over the counter.”

As well as enabling the couple to profit from their investment, electricity allows Ureka to watch “soaps” on television and the children to study in better conditions than with a kerosene lamp.

• Fisher Herath Ranjan (right): Has found a faster-growing income than from the sea

The family received their loan at below-market interest rates through a pilot project, Power Fund for the Poor, financed by ADB through a $1.5 million grant from its Japan Fund for Poverty Reduction.

The fund targeted poor households who are within range of a grid but lack the ready funds to access it. Connection costs alone these days run from SLRs15,000 to SLRs20,000 ($130 to $170).

From 2004 to 2009, ADB's revolving fund, handled by microfinance institutions, brought electricity to nearly 15,000 households.

Building on these results, ADB approved in April 2009 an assistance package of $164 million for a Clean Energy and Access Improvement Project, which includes a $3.5 million loan for another revolving microfinance fund.

In scaling up, the new credit program aims to bring at least 15,000 households into the grid by 2010 and a further 60,000 by 2016. This supports the government's goal to raise countrywide electricity coverage from 82% to 88% in 2016.

The pilot project was initially implemented through two microfinance institutions,

The new credit program aims to bring 75,000 households into the grid by 2016.

• Rangana Thushara and wife Ayomi at their roadside shop: Staying open longer hours

though one lost interest after deciding to focus on commercial lending.

Most of the work of promoting the program and handling the loans was undertaken by Sarvodaya Economic Enterprise Development Services (SEEDS), a nonprofit grassroots organization with a track record in rural development.

Using its extensive domestic network, SEEDS at first implemented the project in four districts, later expanding to eight. It employed two loan recovery officers for each of the districts: Anuradhapura, Hambantota, Kegalle, Kurunegala, Matele, Monaragala, Petaluma, and Polonnaruwa.

SEEDS disbursed 7,000 loans and, assisted by a remarkable loan recovery rate of 97%, was able to provide a further 7,000 second-generation loans. Cumulatively, between 2004 and February 2009, SEEDS disbursed 14,639 loans totaling SLRs235 million ($2 million), according to Alex Jayawardena, SEEDS' assistant director for banking.

"The main challenge was to identify beneficiaries and assess their ability to repay loans," says Jayawardena. To qualify for a loan, families needed to have an income of at least SLRs6,000 to SLRs7,000 ($50 to $60) a month and contribute 20% of the connection cost.

"The main challenge was to identify beneficiaries and assess their ability to repay loans."

Alex Jayawardena
Assistant Director for Banking, SEEDS

SEEDS charged an interest rate of 16% per annum—significantly below prevailing commercial rates—on loans that averaged SLRs15,000. "We could also be flexible when, for instance, farmers had trouble with repayments after a poor harvest," he adds. "We could waive interest charges or extend the repayment schedule."

As a result of their investment, families now enjoy a better quality of life and social status as well as economic gains and security, says Sisira Mohotti, a consultant who evaluated the project in 2007. Half the families in a survey said they had cut energy bills after switching to electricity from kerosene, according to his report.

A grid connection can also increase personal security. "The number of fires and burns to children caused by falling kerosene lamps has been reduced," says Mohotti. "Also, youths with intent to rob are less likely to approach a home which has a light on."

Another important benefit is entertainment and information brought through television. "A TV is one of the first things a family buys once they get connected," says Nihal Wickramasuriya, an additional general manager for Ceylon Electricity Board, the state utility. "The government sees television as an important vehicle for information dissemination."

"Since we have electricity, we find fewer snakes around the house."

Mangalika Widyapathige

• Farmer Manthilaka Gunaratna will pump water from this well: This will irrigate unused land and grow new crops

A visit to isolated parts of hilly Monaragala district in southeast Sri Lanka underscores the benefits of having electricity—and the disadvantages of being without.

Living at the end of a grassy track in the village of Kuda-oya, Mangalika Widyapathige and her husband Francis took out a loan of SLRs15,000 ($130) to electrify their home. They have to find outside work to supplement a subsistence living from growing corn and bananas in a one-acre garden. Francis works as a laborer in a sugar company. Mangalika spent 11 months as a maid in Kuwait before having to return after breaking a leg.

Now Mangalika's hard-won comforts include an electric iron that has replaced a clunky iron that used burning coconut husks as fuel. Holding up the two irons, she says the old one used to overheat and burn holes in their clothes. She also bought a television

• Children in a village in Hambantota district: Electricity brings longer evenings

• Mangalika Widyapathige uses an electric iron: The clunky iron on the left used to burn clothes

• Pushpa Malkanthi is waiting to be connected: Will be able to sew in the evenings

and enjoys watching dramas, while her 19-year-old son Indunil prefers educational programs.

“Since we have electricity, we also find far fewer snakes around the house than before,” she says.

In striking contrast, Pushpa Malkanthi, bending over a manual sewing machine in a small, dark dwelling in nearby Konketiya village, is waiting eagerly for her application for a power connection loan to be processed.

Her son Akalanka is sitting on the floor in a corner, sealing packets of ground chili to sell in the market. “With electricity, we plan to buy a blender so we can grind spices at home instead of taking them by tricycle to be processed in town,” she says. The reserved, hardworking woman will also be able to sew and make coconut oil in the evenings.

• Storekeeper Ureka: A refrigerator helps sell ice cream and soft drinks

Beside the main road, Rangana Thushara and his wife Ayomi run a shop selling supplies to pupils and staff at a nearby school in Buduruwagala village. They opened in December 2007, and applied for a power connection loan a few months later. “Business grew 50% since we got electricity,” says the young entrepreneur. “I keep the shop open in the evenings and I also make money copying CDs on my computer and renting out a cell phone.”

In Randenigodoyaya village, where rainfall is scarce, farmers are investing in grid connections so they can use electric pumps to increase irrigation and crop production. Pointing to a deep well, Manthilaka Gunaratna says he will pump water to land that is currently unused and he plans to grow new crops like beetroot. He has already bought pipes and is using a SLRs25,000 ($214) loan to buy a pump as well as a connection.

His wife Podimenike is a community leader who is encouraging others to follow suit, says SEEDS recovery officer Nishant Bandara. As a result, says Bandara, he has arranged 3 loans and hopes to sign off on another 30.

Meanwhile, villages around coastal Hambantota are seeing an increase in construction activity—and demand for power—as the district continues to recover from the devastating tsunami of December 2004.

In the village of Mriggiwila, brick maker Kamkanange Chandraratne says business has

Farmers are investing in grid connections so they can use electric pumps to increase irrigation water.

• Brick maker Kamkanange Chandraratne: Has doubled production by hiring laborers at night

boomed since he electrified his workshop with a loan. By hiring two laborers to work at night, he has doubled production to meet demands from the steady stream of suppliers who come to his door.

In nearby Sisilasagama, carpenter Sugath Wasantha is fashioning wood with an electric-powered multipurpose tool in the workshop at the back of his home. He borrowed SLRs20,000 ($170) for a grid connection, and grosses about SLRs30,000 ($250) a month by making furniture and frames for doors and windows. His pregnant wife Nadeeka cools herself with an electric fan and says her next priority is to buy a television.

In this bustling district, loan officer Anil Dammika says repayment rates average 98%. The project has been so successful that he would like to see loan ceilings raised.

In its expanded microfinance program, ADB is incorporating changes as a result of lessons learned from the pilot project.

One difference is that the state utility will administer the credit component instead of the microfinance institutions. "The pilot project had a mechanism for loan repayments but not for paying electricity bills," says CEB's Wickramasuriya, who is involved in the latest project. "Under the new arrangement, customers will include

"The new program will continue to rely heavily on grassroots service providers."

Tomoyuki Kimura
ADB Principal Energy Specialist

• Carpenter Sugath Wasantha: Uses an electric tool to fashion furniture and frames

loan repayments when they pay their electricity bill to CEB."

This will further improve the loan recovery rate as CEB has a legal mandate to recover billed energy charges. In addition, the revised procedure will bring more revenue to a heavily-indebted CEB, which runs rural electrification programs to meet society's needs, but at a loss.

"The new program will continue to rely heavily on grassroots service providers to interact with the community, sensitizing potential consumers, evaluating their credit worthiness, and assisting them to pay the installments," says Tomoyuki Kimura, who processed the project for ADB as a principal energy specialist.

Above all, the program will provide thousands more families with access to the grid—and make their lives safer, easier, and more profitable. ■

• Loan officer Anil Dammika talks with a client at Tsunami Village in Hambantota district: He would like to see loan ceilings raised

• Women in Tsunami village, Hambantota: Higher social status and better quality of life

About the Energy for All Initiative

ADB's Energy for All Initiative was launched in February 2008 with two objectives. Within ADB, Energy for All will replicate and scale up access to energy projects targeting poor and remote communities where energy poverty remains endemic. On the regional level, Energy for All is supporting a new regional partnership—the Energy for All Partnership. The partnership provides a platform for cooperation, knowledge and technical exchange, innovation, and project development for scaling up access to energy. Through the collective effort of partners, the Energy for All Partnership aims to extend access to energy to an additional 100 million people in Asia and the Pacific by 2015.

The Energy for All Initiative is supported by the Government of the Netherlands.

Powering the Poor

The Asian Development Bank (ADB) is committed to helping achieve access to energy for all people in the region. The stories in this publication—told through villagers and those helping them on the ground—portray resourceful ways of giving poor and remote communities access to clean and renewable energy. The case studies look at different types of energy projects—solar, micro hydro and biogas—as well as innovative approaches in implementing and financing projects.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two thirds of the world's poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org
Publication Stock No. ARM090124

Printed in the Philippines