

August 2014

Amaray

Energy and development for rural areas



Safe Rural Homes

How to achieve sustainable access to electricity

Peruvian Women

Energy that promotes gender equality

Rural electrification

Cajamarca

In rural areas of Peru, four million people without access to electricity. The dispersion and remoteness of the locations and difficult technical and economic feasibility of the projects make it difficult to reach the entire population.

Despite this reality, the process of electrification has reached approximately 70% of the rural population, in contrast the only 7% twenty years ago, thus improving the quality of life and diversifying the economic activities of the inhabitants. However, are we ready to introduce sustainable energy into a town in a sustainable manner?

Before the meter

Cajamarca

When networks reach a town that has never had electricity, electricians project infrastructure only up to the meters. From there, to the point of end use, the connection has to be completed by the user.

While the advent of electricity is a definite benefit, sustainable access involves a technical stability of electrical flow to end use. However, most families and small businesses, due to the lack of information and skilled workers in the towns, may not be very convinced of it.

Domestic connections

Cajamarca

Due to lack of knowledge and using low quality materials , electrical installations in rural households and domestic connections are made without any quality standard and precarious safety.

This represents a risk for the families who use the electric service and limits the development possibilities from the appropriate use of electricity, preventing its potential for endless economic activities and the sustainability of energy access in rural areas.

A villager from Cachachi district, in Cajamarca, recharges her cell phone using a Pico-PV system.

Dear Readers,

We know that electricity gives us great advantages and we use it for endless daily activities. However, how many of us who are in daily contact with electrical appliances, would be able to make a secure electrical connection in our home? If something goes bad or if we wanted a new light fixture, would we know what to do?

If you already know the answer to this question is obviously to call an electrician, since the risk of "play" with electricity is great, imagine what will it would be like for those rural people who have never had electricity and suddenly receive power in their communities. Clearly, we know that electricity is a contribution to their development, but: Who makes the connections? How to decide what materials to use? How to ensure that access to energy is safe for the home? The reality is that the degree of insecurity in residential connections in rural areas is evident, thus putting at risk the security, access and sustainability of the awaited rural electrification.

Facing this reality, in this edition of Amaray we present the stories of those who seek to improve these conditions, also finding that this situation represents a "market" for local entrepreneurs and technicians who can meet this totally neglected demand. In addition, they show how large suppliers of electrical equipment or systems of alternative lighting (PV), can finally overcome geographical barriers and enter these new rural markets.

You will also find in this issue a look at Peruvian women; their characteristic fighting spirit and their fundamental role in development as key actors for access to energy in rural areas. Thus, we believe that the element of "gender" must be present in all implemented public policies that seek to have a positive impact on people and the fight against energy poverty.

We hope you enjoy this issue and encourage you to visit our website to download the digital version and leave your comments.

Warm Regards,

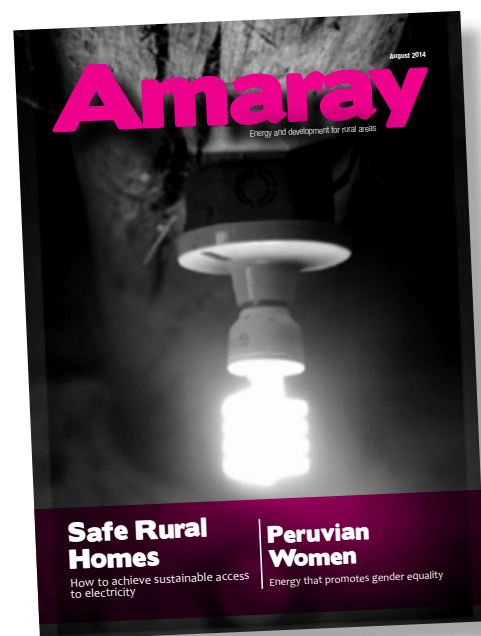
Ana Isabel Moreno Morales
General Director, Energising Development Project, EnDev-GIZ Peru

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A compact fluorescent light bulb works well and safely inside a home in the Cajamarca region. Thus, the safe use of electricity ensures sustainable access to electricity in rural locations.

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Energy and development for rural areas

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The rural electrification program in Peru

While the level of electrification in the country has increased dramatically in the past 20 years, in rural areas there are still 30% that do not have access to this service, which has important effects on health education and productive development of people. Because of their remoteness, many of them can not implement conventional networks, so that renewable energy sources are an interesting alternative.

By **Pedro Gamio Aita**, former Peruvian Vice Minister of Energy

Rural electrification in Peru faces the challenge of reaching remote and inaccessible communities.

Rural electrification in Peru has special features such as the remoteness and inaccessibility, the reduced unit consumption, and scattered dwellings, often in extreme poverty and low purchasing power of its inhabitants. Furthermore, there is insufficient road infrastructure. They also lack basic social infrastructure in health, education, sanitation, housing, technology to improve production systems, etc.. This situation results in low profitability for rural electrification projects, that are not attractive to private investment and require proactive participation of the state.

These projects in turn have high social returns as they integrate people to better education, communication with the world, the health of its inhabitants, broadens the horizon of life, facilitates housework and also serves projects to promote productive uses, such as pumping water and irrigation, craft workshops, bakeries, small welders, mills, tanneries, and other small industries.

Electrification ratios for 1993 were 54.9% nationally, 77% urban and 7.7% rural. And 20 years later we have a country of 90% coverage, and in the rural countryside of 70%. The State, through the Ministry of Energy, has been running, for five administrations, a sustained rural electrification program, using conventional networks with a connection cost \$1,500 to \$1,800 per household. In addition, there are still some problems using available electricity, as well as difficulties of operation and maintenance of systems for distributors. Thus, in recent years, Peru has begun to diversify, using various technologies applicable to that reality.

To access the power, we must consider, the situation of the small town center, cost benefit analysis, proximity networks of the National Electric System (SEIN) and / or the possibility of defining the completion of a Isolated System; from all developed sources called Rural Electric Systems (SER) and rural concession. The inability or technical and / or economic inconvenience to connect to large power system, leading to prioritize the use of renewable sources such as hydropower through the construction of Small Hydroelectric Plants (PCH), mainly in areas located from the Andes to the western and eastern slopes, where there are waterfalls. Sometimes the assessment leads to other options, such as solar energy, through the implementation of photovoltaic systems for domestic use, preferably in geographic areas with solar potential. Here's the goal: install and maintain 500,000 panels by 2018. Another option is the wind technology, which may be preferably applied in the intermediate valleys and the coast or near the coast.. It remains to define the rate for this type of technology and hybrid systems, which use various technological options or sources of energy.

The concern for the conservation of the environment and quality of life, has been driving the use of renewable energy, and adapting its application as an alternative solution to the problem of electrification of isolated areas, especially if incorporated in the evaluation is the impact of climate change. A fast possibility to improve energy access and reduce the percentage of citizens without this essential public service, are the pico-solar systems - small solar panels for basic lighting, television, radio, laptop and phone.

There is also a line of work that promotes greater use of electricity in rural areas for productive activities, training on the benefits of electric power in order to help increase productivity and improve living conditions in rural communities and in various production industries - coffee, cocoa, tea, grain processing, bakery, dairy and livestock development. This is the case in three pilot projects in Cusco, Junín and Lima. Here, the challenge is to establish a competitive fund that allows civil society to participate in the process, using the best initiatives materials.

Thanks to electricity, teachers have implemented improvements in teaching classes and can use technological tools (microscopes, computers, internet). Students have the option to extend their work hours, educational programs and watch videos, get help from their parents, best meet the tasks and have more interest in studying, creating higher expectations of development as people. Parents are involved in their children's education by attending meetings with teachers in the evenings. Furthermore, there is a saving, since the cost of lighting is lower than that of candles, fuel, batteries, etc. There are better chances of increasing their income, they have the ability to work nights, and small shops can sell fresh perishable products (refrigerator). The program called COCINAS PERU or improved stoves, another Ministry of Energy and Mines (MEM) program has reduced the incidence of disease to the eye (sore eyes and tired vision) and respiratory tract due to candle smoke and combustion of diesel, firewood or dung. It has also reduced the presence of gastrointestinal diseases resulting from improper handling and storage of food.

Care in health facilities has improved over time (more hours and emergencies at night) and quality (use electric instruments and access to refrigeration). There is greater public safety, for the street lighting allows people to move safely at night, decreasing the occurrence of theft. There is safety within homes, as electricity has minimized the occurrence and risk of fire (by the use of candles and lighters). The program as a state policy means to secure rights and opportunities.

These projects in turn have high social returns as they integrate people to better education, communication with the world.

Rural electrification with autonomous photovoltaic systems

Promoting a model of Public Private Partnership in order to accelerate the implementation of electrification projects in remote areas. Currently underway is the first auction of autonomous photovoltaic systems based on this model.

Por David Orosco Zumarán, asesor del Despacho Viceministerial, Ministerio de Energía y Minas.



A resident of the town of Santa Lucia, in Ica, with a photovoltaic system.

The public policy of rural electrification in Peru has made significant progress. The General Rural Electrification Act (Law No. 28749), June 2006, represents an important milestone in this process by creating the regulatory framework that enabled the system to subsidize investment by the state, incorporating it into the price system of electrical distribution. Thanks to this policy framework the pace of rural electrification reached investment levels exceeding one hundred million dollars annually (\$ 100 million / year).

However, even with the increased amount of investment in the expansion of electricity networks, Peru ranks last in South America with respect to the coverage of households with availability of electricity, as stated in the last report (2012) of the "Synthesis Energy Fact" Committee of Regional Energy Integration (CIER). This is explained not only by the social and geographical reality of our rural areas, where investment in grid connection for housing is greater than U.S. \$ 2,200, and where over 70% of connected households consume less than 10 kWh per month. The other factor that allows us to understand why our position in electricity coverage is behind, compared to other countries in the region, is the set of governance problems of public policy for rural electrification.

The public policy of rural electrification using autonomous photovoltaic systems was raised, looking to overcome these problems. For this we studied an appropriate institutional design that aligns incentives and goals, with clear and effective enforcement schemes and accountability.

The central part of this change was to seek a solution of the Public Private Partnership (PPP) type involving private operators. The purpose of having them is to get faster execution of projects and ensure sustainability in the management of autonomous photovoltaic systems. To this end, it was foreseen to leverage this new strategy of electric inclusion in existing and proven successful experiences to involve private players in the electricity market. These success stories are related to contracts BOOT (Build, Own, Operate and Transfer) which allowed the use of private operators in the construction of electricity transmission networks, and specifically in the construction of photovoltaic solar plants connected to the network.

The Public Private Partnership (PPP) uses self-sustaining, non-public resources, but the mechanism of Electrical Social Compensation Fund (FOSE) is used for the electricity market as a whole cover the difference between the rate resulting from the auction and charges to the user. Also, the risk of the project investment is covered, ensuring minimal investor risk in photovoltaic systems, plus an incentive scheme for investors to cover the largest possible number of houses, with a cap of 500,000 units.

Also, the institutional design of this public policy involves the participation of existing electric utilities,

to participate as traders (billing, collection) versus energy users made available by the private operator. To this end, the legal position of Special Order under the existing rules of management of public companies will be used. Accordingly, the distribution companies are commissioned by the Ministry of Energy and Mines (MEM) to implement the public access policy of photovoltaic electricity in certain areas covered by the program. However, this request is part of a business model involving a private operator for the supply of PV power.

In this business model, the private operator is responsible not only for the installation of photovoltaic systems, but also for its operation and maintenance for 15 years. Within the business model, the private operator behaves as an energy supplier company for public distribution of electricity, with the particularity that this power supply is intergrated into each target housing program. This is equivalent to saying that the public utility electricity distribution service receives power from the private operator responsible for the operation and maintenance of PV systems

The business model also includes the use of a trust to eliminate the risk that cash could be part of the form of compensation, because cash is associated with users of electricity. It is noteworthy that the planned business model involving a public distribution company, isolates the private operator from collection risk to users. The remuneration of the private operator would not be affected by the level of delinquency of service users. In this business model, it is the public distribution company which takes care of charging users, using a model of collection management that is the responsibility of this public company, whose costs and risks will be covered by the Special Order.

Currently underway is the first auction of autonomous photovoltaic systems, with the APP scheme described above. It has divided the country into three zones (north, center and south) covering the entire national territory. Each bidder may bid for one or more zones, requesting an annual guaranteed compensation for the care of all photovoltaic supplies that can be found in these areas to a limit of 500,000 in the total of the three zones.

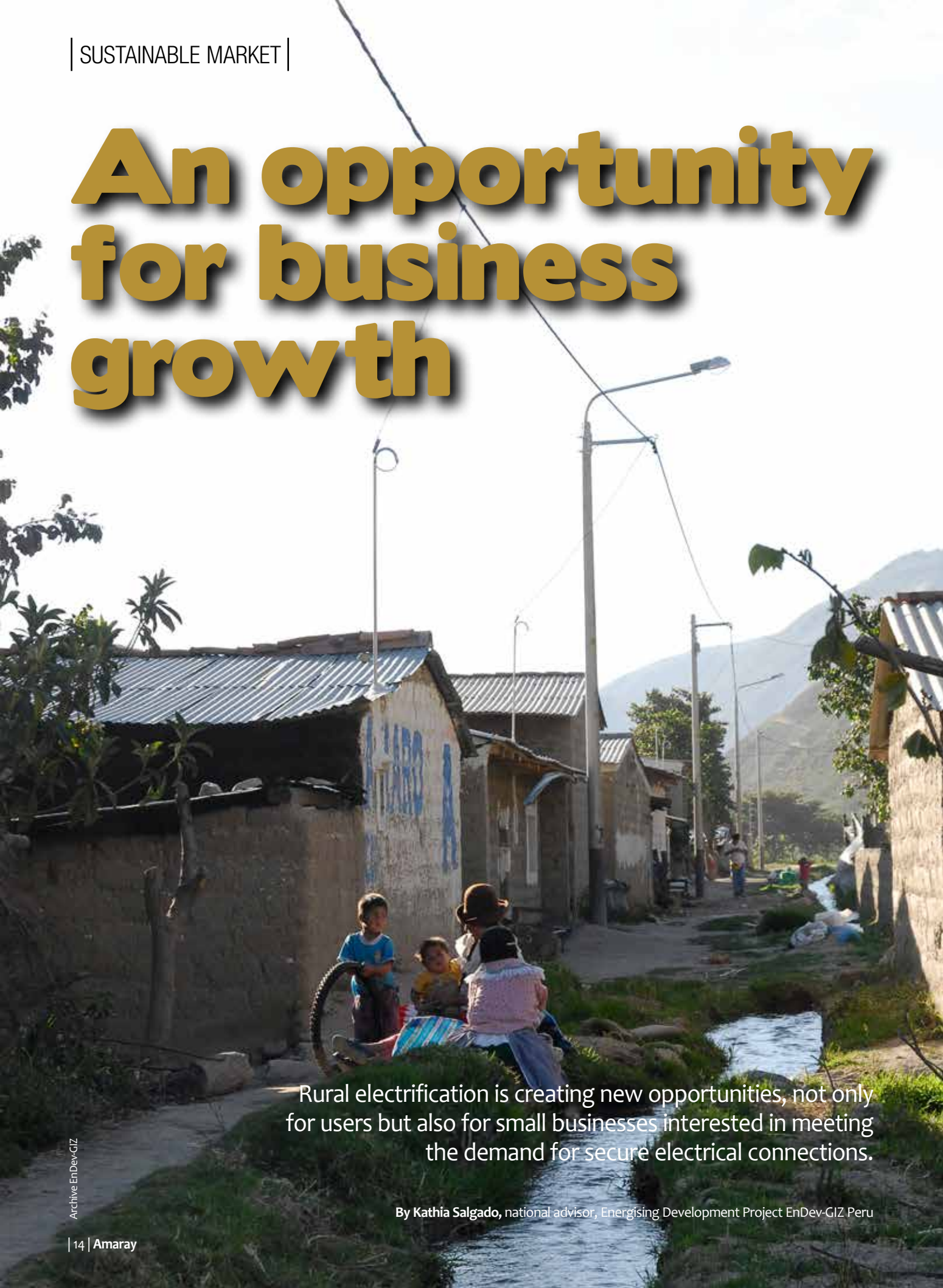
In accordance with the auction, the MEM has designed and is close to implementing the Special Order to public undertakings of distributing electric energy, to be in charge of:

Pre-operational stage.- Training and enumeration of potential users of stand-alone PV systems, in order to prepare the conditions for the arrival of the private operator, who will be responsible for the installation of systems and maintenance and service of the same for 15 years.

Operational Status.- The billing and collection service and channeling orders for users service to those private operators who are responsible for service and maintenance.

In this business model, the private operator is responsible not only for the installation of photovoltaic systems, but also for its operation and maintenance for 15 years.

An opportunity for business growth



Rural electrification is creating new opportunities, not only for users but also for small businesses interested in meeting the demand for secure electrical connections.

By Kathia Salgado, national advisor, Energising Development Project EnDev-GIZ Peru

We are aware that the Peruvian government has increased investment in rural electrification in recent years to increase coverage of electricity to many remote locations. This effort has also stimulated the market for services around the electrification, encouraging the creation of companies seeking part of the great state investments.

However, despite this evident investment in electrical infrastructure, there is a demand which has not received adequate attention, as thousands of rural households have access to electricity for the first time, but do not have the sufficient capacity to make safe connections in their homes.

In this context, there are several small to medium size enterprises in different regions of Peru, which have recognized that in the rural areas, there are poor electrical installations and materials of low quality. The main causes of this problem are the lack of information in the population and the lack of qualified electricians in the area.

This is how various companies in the rural electrification field are finding an additional opportunity for economic growth, seeking to meet the demand for domestic installations, while at the same time implementing projects in medium and low voltage.

"A representative of the German Cooperation commented us about a proposal for electricity within rural households and we thought it might be important for the people in these communities", says Rafael Zeña, project manager of a company that focuses its operations in the Callejón de Huaylas, in the department of Ancash. "Although we had some difficulties, the families were happy and we realized that in the rural area we had opportunities to work", he adds.

In this context, the German Cooperation (GIZ), through the Energising Development Project (EnDev), is identifying the need for communities receiving electricity for the first time, to call upon small and medium local businesses to raise the quality of electrical installations in homes and institutions in the rural areas. In all, they are working with companies located in 13 departments of Ancash, San Martín, Cajamarca, La Libertad, Puno, Ayacucho, Arequipa and Tacna.

ADDED VALUE

In all cases, a comprehensive offer was developed, comprised of three elements: qualified services, quality materials, and information for the population on the safe and efficient use of electricity. Companies also recognized that this process gave added value to their activities.

"We had the knowledge and experience around electrical issues, but when working with EnDev we recognized that we were really adding value to our work and there was the difference", said a representative of one of these companies. "We know that the quality of materials and devices is extremely important in electrical projects. So we provide products of quality and at good prices. We believe that rural people also have the right to security", he adds.

So, from this experience evolved the strengths of the company and, above all, it strengthened its position through supplying a differentiated service that gave added value from social responsibility. In that sense, diversifying the range of products for indoor facilities and including a portfolio of services may be interesting from the point of view of institutions looking for companies to implement projects with a comprehensive offering for the rural area.

"We recognized that we were adding value to our work and there was the difference".

Small and medium companies can offer comprehensive electrical services which include working with rural communities.



Safe Rural Homes

How to achieve sustainable access to electricity

More than 169,000 people in remote areas of the country have benefited from this project, which allows safe access to electrical power. The international cooperation has partnered with various companies in the sector to offer good quality materials at social prices and to promote the training of young people in these towns so that they can serve as electricians.

By Kathia Salgado, national advisor, Energising Development Project EnDev-GIZ Peru

The efforts of the Peruvian government in rural electrification in general have been successful: in the past six years more than 3 million Peruvians have accessed the electrical service. However, this progress does not show the number of new users facing the precarious conditions in which families make dangerous use of electricity within their homes, due mostly to lack of skilled labor in rural areas, high costs of quality electrical equipment and little or no information to new users on the importance of access and safe use of electricity.

Because of this, the German Cooperation (GIZ), through its Energising Development Project (EnDev) and in partnership with the International Cooper Association PROCOBRE Peru, the companies INDECO, BTicino of Peru, Philips Peruvian and Tuboplast, are joining forces and implementing the Safe Rural Home (SRH) initiative, which seeks to improve the safety and quality use of electricity in rural areas receiving electricity for the first time. In this context, SRH aims to promote and facilitate for the population, secure access and sustainable household electricity through basic secure electrical installations.

Through this initiative, young people whose regular activities are agriculture, have been trained so that they can offer their services and carry out electrical installations in their towns, thus generating a

benefit to their neighbors, as well as income for themselves.

Also, companies that are part of this initiative are willing to provide quality materials such as energy saving bulbs, electrical cables, PVC pipes, switches and outlets, necessary to perform the connections at a social price that allows an affordable cost to rural areas without affecting their marketing costs. The results obtained are encouraging these companies to assess the possibility of including this strategy in their commercial structures with the possibility of entering the rural area, a market that is difficult to access due to geographical barriers and scattered dwellings. Thus, this model is allowing a link to be generated between rural consumers and the companies that produce the electrical equipment.

To date, since 2009, SRH has come to benefit more than 169,000 people in various regions of the north, center and south of the country. In addition, energy distribution companies have experienced the benefit SRH has generated for new users, which is why they are planning to incorporate the initiative into their regular activities through awareness of the population and training of local technicians, in partnership with various actors at the local level, such as communal authorities and municipalities.

This progress does not show the number of new users facing the precarious conditions in which families make dangerous use of electricity.

Dangerous electrical connections present a risk to the sustainable use of electricity in the rural areas of Peru.



A study being done by EnDev Peru in the San Martin region, shows that families maintaining their electrical connections in a dangerous and unsafe manner, have a lower electricity consumption in relation to families that have secure electrical connections.



The Safe Rural Home initiative looks to ensure that residents use safe electrical practices, especially inside their homes.



IMPLEMENTATION STAGES

1. **Preparing the project** involves identifying elements in the local context to target demand and develop partnerships with stakeholders and promote commercial conditions for access to high quality materials and electrical accessories.
2. **Sensitization process** is an indispensable theme in the implementation process, providing information and creating awareness among rural people about the importance and benefits of electricity, and the conditions of minimum electric security which facilities should have. This process also facilitates the promotion of efficient and productive use of electricity.
3. **Developing local capacities** aims to train rural residents in electrical installations, so that they can meet the demand for installations, maintenance or troubleshooting extensions which their neighbors may require. This step also seeks to promote a dynamic market, where there is an offer of services able to meet demand in rural areas.
4. **An important component** in the implementation of Safe Rural Home is the materials supply which ensures delivery of appropriate components and quality. Development partnerships with local businesses interested in supplying this demand is critical, and the establishment of conditions of sale and prices which allow access by the rural population.
5. **Finally, mass installation stage** allows more households and institutions, including small enterprises, to have a safe electrical installation. Existing community structures are particularly important at this stage as they become the point of local support to ensure mass participation of the population.

Monitoring and supervision is a component present in all stages of implementation to ensure the progress of the project, and secondly, the quality of installations that are made.

RESULTS

1. 35,965 safe electrical installations benefit homes, schools, health centers, community centers and small rural enterprises.
2. More than 500 people trained in the installation of domestic connections.
3. Projects implemented in 11 departments at the national level.
4. More than 169,000 people briefed on the importance of access and safe use of electricity.



In recent years electricity is reaching more rural localities in the Ancash and Cajamarca regions.



COMPANIES PROVIDING ELECTRICAL MATERIALS

While companies are willing to grant special prices that do not affect their production costs, they also value the opportunity to enter the rural area and build trade alliances with local businesses. So, they are evaluating the possibility of including this strategy in their regular commercial structures.

Phillips Peruvian

Is a supplier of energy saving light bulbs that contribute to the efficient use of energy.
www.philips.com.pe

BTicino of Peru

It supplies electrical accessories such as sockets and switches in order to help families gain access to quality materials.
www.bticino.com.pe

Tuboplast

Provides PVC pipes and fittings necessary for channeling electrical wiring, because exposed cables make for unsafe conditions.
www.tuboplastperu.com

INDECO

Is a supplier of cables that conduct the electrical energy for all housing environments, facilitating the use of appliances.
www.nexans.pe

Energising Development Project EnDev-GIZ Peru

The Energising Development Project EnDev-GIZ Peru seeks to facilitate access to basic sustainable energy services, especially for rural populations. The project promotes energy for cooking, energy for lighting, energy for productive uses, and microfinance for energy services.

Within energy for lighting, the project has achieved the implementation of its initiative Safe Rural Home and has improved access to electricity for over 21,000 homes and social institutions in rural and marginal urban areas in 11 departments.

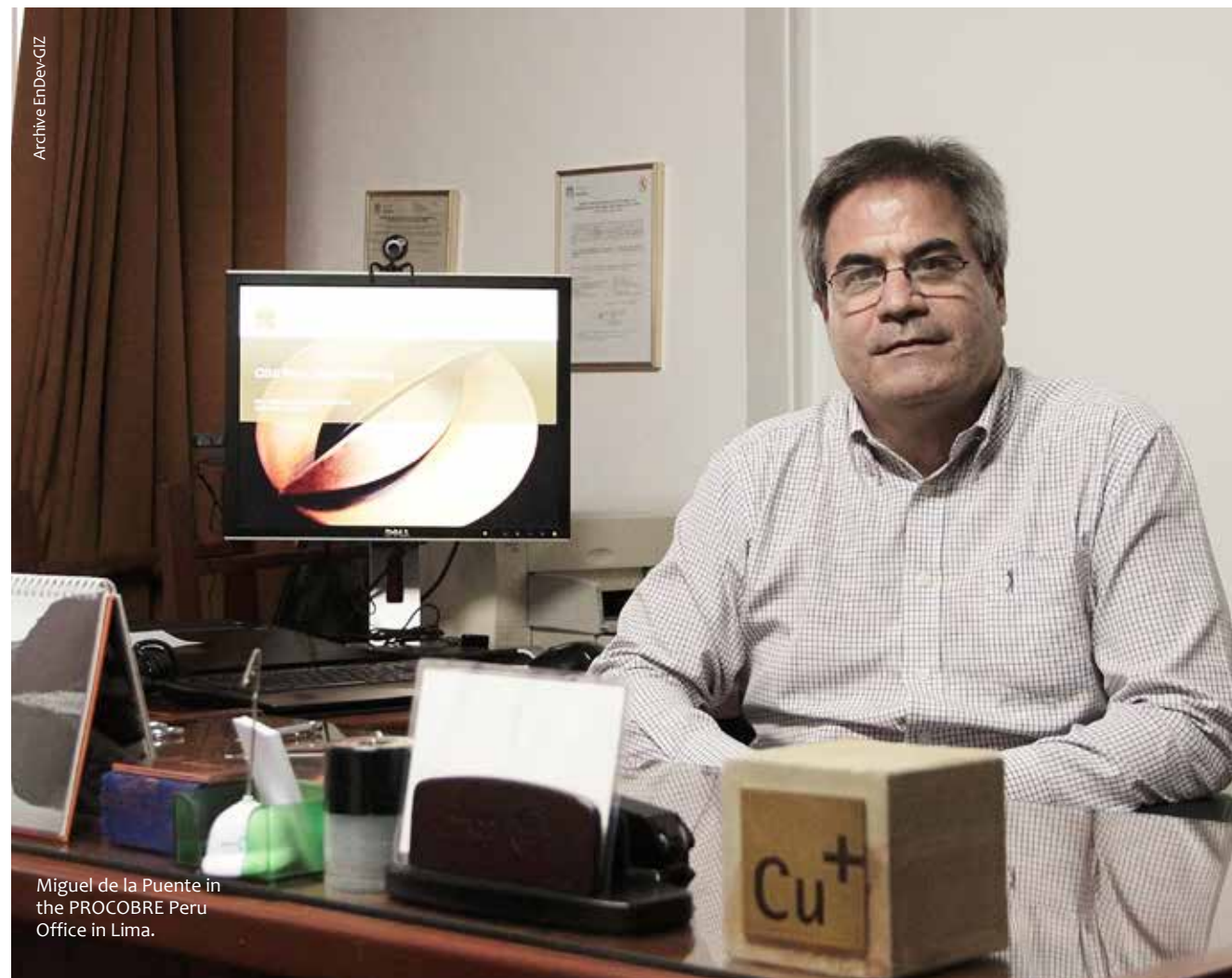
EnDev has been working in Peru since 2007, being executed by the German Cooperation (implemented by GIZ). The project is present in 23 developing countries and it's financed by the Federal Republic of Germany, the Netherlands, Norway, Australia, the UK and Switzerland, which aims to provide sustainable access to energy services to 14 million people by 2015.

www.endevperu.org

“This is the third year supporting the program”

The executive director of the Peruvian Center for Cooper Promotion PROCOBRE Peru, Miguel de la Puente, highlights the achievements of the program Safe Rural Home in improving the quality of life for residents in outlying areas of Peru. He not only reaffirms the decision of this entity to participate in the project, but also indicates that they are looking to give it a continuing role.

By Carlos Bertello, communications officer, Energising Development Project EnDev-GIZ Peru



Miguel de la Puente in the PROCOBRE Peru Office in Lima.

What is the mission of PROCOBRE Peru?

PROCOBRE Peru is the Peruvian Center for Cooper Promotion and is part of the International Copper Association (ICA), which is a global institution that coordinates all actions promoting the use of copper and copper alloys. There are about 30 promotion centers in 60 countries. In Latin America there are five, one of them being PROCOBRE Peru. In that sense, we are very attentive to the possibilities that exist in the market to promote the uses of copper, mainly in power generation.

What are your main activities?

Comparing 20 years ago, today six times more energy is consumed, because there is a greater amount of electrical and electronic equipment with a larger population. We work in 4 areas, one gathers market information based on a monitoring of the current situation of electrical installations.

We also participate in various standardization committees. The goal is to ensure that market rules are clear and that their implementation is effective. For example, it has been 15 years since the first electric safety committee was established in Peru, joining efforts with various State agencies, private companies, associations, educational institutions, the electrical industry and media; we were all committed to the spread of safe buildings in urban areas. This means that each contributes within their means to ensure that buildings are safer.

Finally, other areas in which we work are education as an effective means to achieve understanding and proactive use and we use all possible communication channels to achieve adequate coverage.

What is Urban Safe Home?

We have been working on Urban Safe Home for over 10 years, which aims to reduce the level of electrical risk. The program was born in Brazil and developed in 6 countries and 40 major cities in Latin America.

The program includes new and existing electrical installations and calls for continuing maintenance and support information to reduce accidents and to avoid loss of infrastructure and human lives.

This is a cooperation between a number of companies and institutions, for example electricity distributors are agents to influence positive changes in their customers to make rational use of energy.

An important issue is the standardization of product certification, labor and installations. This will provide qualified technicians, who will provide a reliable service at a reasonable cost.

How do you joined Rural Safe Home?

It is a more complicated issue in remote areas. Peru has enjoyed a steady growth in rural electrification. There is interest from the government to raise the percentage of electrification. They can install the power lines, but the question is under what conditions the internal installations in homes will be achieved? In this context, the model proposed by Safe Rural Home of the German Cooperation (GIZ) is highly effective.

The German Cooperation (GIZ) has experience in this field and invited us to participate in the initiative by contributing our experience from Safe Urban Homes. Furthermore, we have also been providing a link by bringing and involving electric companies such as INDECO, Phillips and BTicino, to join the program efforts and share resources.

First, the service is not free, the end user pays for it and demands proper installation. Second, the products used are certified. Third, we train the youth in the area, generating job opportunities. In addition, they will provide maintenance to these facilities when the installation is complete.

So this must go on...

We are interested in social development. We have conducted a pilot program of 1,500 households successfully and we hope to expand this. It is also important that the project be extended with the cooperation of the power distribution companies and the involvement of mining companies in their areas of influence.

This is the third year supporting the program and we are looking forward to a continuation of the project. All this means an improvement for quality of life and energy is an opportunity to continue growing.

“It is also important that the project be extended with the cooperation of the power distribution companies”.

PROCOBRE

PROCOBRE is a network of institutions in Latin America whose mission is promoting the use of copper, boosting research and development of new applications, which is their contribution to improving the quality of life and progress of society.

PROCOBRE is part of the International Copper Association (ICA), based in New York, responsible for leading the promotion of copper worldwide. There are about 30 development centers in 60 countries, one being PROCOBRE Peru.

www.procobre.org

Life Changes

Photographs: Archive EnDev-GIZ



Local youth were trained to make interior electrical connections.

The residents of the towns of Chilete and Chingol improved their quality of life with access to electricity. Despite its remoteness, because of alternative systems, they now have light for their children to study and are more connected with the outside world, they have radios or televisions in their homes and recharge the batteries of their cell phones at home. All this, moreover, is cheaper than the use of candles or diesel fuel. Here are their testimonies.

By Carlos Bertello, communications officer, Energising Development Project EnDev-GIZ Peru

In the town of Chingol, Cachachi district, Cajabamba province, electrical service came half a year ago and since then the home of Mariquita Acevedo has a prepaid electric meter. "Every month we go to Cajabamba and pay for the monthly service. That can be 10 or 15 soles (3-6 US dollars). Then we return and put the code on the meter", she says while one of her sons shows the panel which registers its power consumption.

Each time she makes a payment Mariquita receives a ticket with a 20 digit number to type in the meter. With this, she will have electricity in her home from a prepaid service automatically, that is, if the credit in the meter runs out, the electric service would automatically stop. Furthermore, the appliance has a beeper that generates an alert when power is about to run out (last 2 KW). Thus, the service users become administrators. And for safety, the meter also has an anti-theft device, because if someone tries handling or opening, it gets blocked and gives a warning.

Mariquita tells us that she sometimes has to recharge more than once a month, depending on the use, typically including a radio, TV, several energy efficient bulbs and recharging of her cell phone.

Thus, this type of meter has been installed to all residents of the town, which before was lit with candles or diesel lamps, using a weekly package, that is three soles/week or around 12 soles per month (4 US dollars). Later, fortunately, they acquired a pico photovoltaic system, which meant

a savings and better lighting for their children to study.

However, despite the advantages of having electricity at home for half a year, the precariousness of the electric connections in Mariquita's house is also evident. She tells us that upon the arrival of electricity, one of her older sons made connections for two lights in each room of the house, adding about 10 lights in total. Unfortunately, such attempts do not guarantee a secure connection for the home. Fortunately though, she tells us that so far they have not suffered any accidents.

Seeking to counter this reality, the program Safe Rural Home (SRH) of the Energising Development Project EnDev-GIZ, seeks to promote sustainability of the rural electrification process by training local technicians and providing access to secure electrical installations in homes in rural areas.

Thus, in the neighboring town of Huañimbita, a villager tells us that when he got electricity, he contacted one of the youth trained by SRH to perform their electrical installations. "Tito made the light installation. Connections are fine and we see that he has done what we have asked. Furthermore, if it would fail, he told us that we call him", he says.

Similarly, with regard to materials, the program took care of the villagers' needs with quality products at discounted prices. "The price is comfortable for us", he adds.

"Every month we go to Cajabamba and pay the monthly service. That can be 10 or 15 soles. Then we return and put the code on the meter".

Mariquita Acevedo shows the prepaid meter that supplies electricity to her house.



SOLAR HOME SYSTEMS

We also got to visit Chilete, a site in the province of Contumazá, representing an important point for traders traveling through the region. While it seems that the area was fully electrified, there still exists peripheral settlements that failed to access the extension of electric service and so required alternative solutions to have electricity.

Thus we find Wildor Cuzco, who has a house next to the road. He explains that he has a Solar Home System (SHS) from a year ago. "We use it for light at night. Before we used kerosene lamps and candles, but the solar panel is much better. Candles sometimes ran out and we had to go get them unexpectedly. Also, before we spent more money and feel we are now calmer and safer", said the resident, who lives with his wife and three children of school age. Also, we note that in this case the same people who installed the panels also made the connections within households, so we are assured that they have been carried out under a good standard of quality.

Under the proposed model by the regional Electrical Infrastructure Management Company (ADINELSA), which retains ownership of the systems, Wildor pay a fixed monthly price of about nine soles (3 US dollars), which must be paid at the office in Chilete center. Otherwise, when you stop paying two months consecutively, they can cut the service. Furthermore, from time to time, company representatives do maintenance of the systems.

Another person from the village, Olinda Castrejón also received a system one year ago. "Before we walked with candles and we were afraid, because we could burn the house. Even my children have been burned in some cases", she says.

In contrast, the SHS allows you to enjoy light, recharge cellular and radio, though most do not have the power required to connect a TV. However, Olinda is aware of the savings and better quality of life which the solar panel brings. Before, she had to bring the cell phone to the nearest battery charging service, for which she paid about a sol (0.3 US dollars). "It was more expensive," she emphasizes.

Another neighbor, Nancy Alcántara, also opens her doors and comments. "We use the system at night for lighting and also to recharge cell phones. Before, we went to town to recharge and we used candles, but now we're better," she says.

"My son uses it to do his homework. Before, a package of candles of 2.50 soles (about 1 US dollar) did not last even a week and we had to spend 10 soles (4 US dollars) every month. Now we pay a little less, about 9 soles (3 US dollars) monthly for the three lights. We also can use the radio and recharge the cell phone", says Nancy, while showing us the accompanying table where her son do his homework, often at night.

"We use the system at night for lighting and also to recharge cell phones. Before, we went to town to recharge and we used candles, but now we're better".

Finally, we walked to the last house of the line, where lives Nieves María Cholón and her husband Jesús Baltazar. "It's been installed fine and there is nothing to malfunction. When the sun goes down the battery is charged and overnight we have light. Only sometimes, when it rains, the charge is a little low, but usually it is good", she tells us.

"Furthermore, it is more secure and there is better light. Before we bought 3 to 5 packs of candles each month, which rose from 1.50 to 2.50 soles (about 1 US dollar). Now we pay a fixed price of 9.10 soles (about 3 US dollars), which we pay on the 20th day of each month. Once, I did not get the bill, but I just went to the office to pay", she recalls, emphasizing that she no longer wants to go back to the times of candles and lamps.

When Nieves and Jesus arrived over 20 years ago, the town had no water or power. Now they have water, but still lack sewers and it is just over a year since the SHS provided general lighting service in their home. So after many years of waiting, these new technologies have finally arrived and offered Chilete an alternative, which is unfortunately out of the reach for thousands of families still waiting for this major change in their lives.



Nieves Cholón has spent more than 20 years without electricity, so the arrival of a solar panel means great joy for her.



While the town of Chilete has access to the national electricity grid, many marginal houses lack this service.



Nancy Alcántara says that access to electricity is an advantage for school aged children, like her son.

TITO AND MICHEL, LOCAL TECHNICIANS

On the other hand, for all those houses in the town of Chingol that needed a standard quality in their internal connections there was Tito, a young community member, who was trained by EnDev-GIZ and then recruited to join the program Safe Rural Home (SRH) of the German Cooperation (GIZ) to make secure connections. So, Tito made connections even before power reached electricity poles. Normally, meters are placed and then some time is spent until the electrical service is actually received in the village, so many families took the advantage to go ahead and begin preparing their homes. In addition, as part of SRH, quality materials were used and offered at discount prices.

"The German Cooperation sought young entrepreneurs who wanted to get involved with the electrical installation process in the field. We live in the area and when people need our service, we can make a quality connection or solve electrical problems. All this, thanks the free training offered by EnDev-GIZ. Every training took a week and they gave us a certificate upon completion. Thus we start promoting our service", says Tito.

From this standpoint, several young men were trained with him, they attended together in the South Cachachi area, which covers about 40 communities representing a total of 800 families. "In some cases the owners helped us install, for example, cutting the wall, which earned them a discount for the service", Tito added.

Initially, when the announcement was made in the area two years ago, around 20 young men were interested in the program. However, to date there are four that have secured the job, provide regular service in their site and are even looking to expand their workspace.

"People already know us because we are locals, but we have also made flyers and we have promoted through local radio stations. Above all, the greatest interest occurs on the imminent arrival of electricity to a locality", says the young man.

Tito seems satisfied with his work. He is improving his skills and seeing how to continue on this road, where he sees the possibility of a profession that allows him to grow economically. "Electricity is everywhere and here in Cajamarca, is growing every day," says the young entrepreneur, referring to a region that still has a large number of villages to be electrified. According to Hidrandina, the regional electricity distributor, Cajamarca is the department with the lowest rate of electrification nationwide reaching only 68% of the population.

Similarly, we asked Michel, another young EnDev-trained electrician, about his experience. "At first we did not know about electricity, but a teacher at school let us know about several trainings offered, including Safe Rural Home of the German Cooperation. So today I see this as an economic possibility, having counted the benefits and harder work on the farm (agriculture). And it is one more benefit we can provide to people", he says.

He also highlights the possibility of further advances and growth in this field, for example, through pico photovoltaic systems. "It is a business that is offering a new benefit for people who have no power and we are trying to expand the market", he adds.

Also, his family is happy to know that he is focusing on something related to the technology. Likewise, it feels it could also be a further possibility for their younger siblings.

"We would like a greater number of youth to be able to access this program. Even though many know something about electricity, not all have the support that we had in order to improve our abilities or access to new technologies. There are many who want to learn and they even ask us questions", he says.

Michel notes that the promotion process is essential and must continue forward. "In some more remote places, no one has any technical training and they do not know anything about energy. So what if they have a problem? They try to resolve it as they can, but if they knew of our services, it would benefit everyone", he says.

"We would like a greater number of youth to be able to access this program. Even though many know something about electricity, not all have the support that we had".



Tito, a young local technician, in the process of final installation and of a safe electrical



Michel holds one of the flyers that he uses to promote his services in the area.



A safe electrical connection ensures proper operation and the sustainability of energy use.

APPROACHING THE POBLADOR

Tito and Michel also tell us about how they perform the installation process on a house and how to conduct advocacy meetings with communities.

"We introduce them to the families and guarantee a safe installation. Then we offer our rate, which is consistent with the farm incomes, which we know are low. We coordinate with them where we can put light fixtures, based on how much they want to spend. Then we tell them what materials to buy and where to acquire products. Finally, to complete the installation we left a SRH sticker, a calendar and our contact data. Furthermore, since we live in the area, if a family would had any problem, we are responsible and fix it", explains Michel.

"We have meetings with various communities to inform them about electricity and offer our services and pico solar systems, especially for those homes that are still outside the area of electrification, as it is an alternative for them. We show the advantages of the product and leave our phone number. Normally, these campaigns are conducted on Sundays and last about half an hour. Thus, many people call us after a few days", says Tito.

Thanks to this program these young men have been introduced to new technologies and alternatives ones, such as Pico-PV systems. In this context, they also saw a chance to earn something extra serving as independent sellers of these novel systems.

Thus, since it they are in permanent contact with people in locations that do not have electricity, they have become vendors for this type of product and provide them to the population without electric service.

"The German Cooperation seeks to train youth as local installers, but also aims to develop complementary skills, so that they can promote their services. Therefore, after technical training came a stage of training in promotional activities. Also, they were given another training so they can learn and sell solar lights, putting them in contact with suppliers. So this has been a sequence which has had an almost continuous reinforcement for further development, as well as strategies for selling products and services", said Edwin Pajares, departmental manager of the project in Cajamarca.

BEYOND THE PROGRAM?

The perspective of SRH has certainly changed the lives of these young men, who can now benefit from this economic activity, combining electric services with the sale of photovoltaic systems. However, both mention that they have not completely stopped farming, maintaining an interesting balance that also respects their local customs.

In that sense, both have the vision of wanting more training and continuing with the installations and the sale of alternative systems. "Before we worked in the field and no one knew that this was coming.

"We have meetings with various communities to inform them about electricity and offer our services and pico solar systems".



Tito and Michel demonstrate alternative energy systems to families without electricity.



A pico photovoltaic system can be used to recharge cell phones.



Besides giving basic lighting to the home, Pico PV systems are also useful outside.

Peruvian Women

Pictures of Annabelle Avril

By Carlos Bertello, communications officer, Energising Development Project EnDev-GIZ Peru

For those who work in the field of rural development in Peru, we know what it means to find people who give us their warmth and greet us with a smile in their homes, giving us the opportunity to learn their customs and technology allowing us to offer alternatives to their communities.

It is that warmth and effort in their daily work, which marks our memories of Peruvian women, who are, as many already know, both the mainstay of the family, as well as a vital force for development that beats in every corner of country.

Through the photographs presented in this Portfolio, we seek to present some of those memories and feelings, which have been captured in images by Annabelle Avril, a French photographer who is passionate about Peru.

Likewise, we emphasize the importance of women in development of energy use. In many cases, women in rural areas are the main consumers of clean technologies such as photovoltaic systems and improved stoves, being in a key position to influence appropriate use of energy in their homes and communities.

“Having lived in the Andes and spent much time with the people there, I know very well their customs, traditions, life difficulties and dialects. Also, I have lessened their fears against a foreigner, who also comes with a camera.

And it is from this spontaneous contact that I learn from people, especially from women. I greatly respect and admire the Peruvian peasant women. With them, I always seek the same, that from one photographic moment, their self-esteem is strengthened by showing, regardless of their origin and folklore, just by being in front of the camera or working, that they are beautiful.”

Annabelle Avril is a French artist and photographer living in Peru since 2003. In Cusco, Annabelle discovered her passion for the photographic work of Carlos Nishiyama, a profound knowledge of Andean rituals. Beside him, Annabelle develops her own perspective on the world beyond the technical parameters: "Feel and photograph the beauty of the people in the depths of their souls and through life scenes showing their true side." Before she came to live in Peru, Annabelle worked in Paris as a journalist.

www.annabelleavril.com



Annabelle Avril



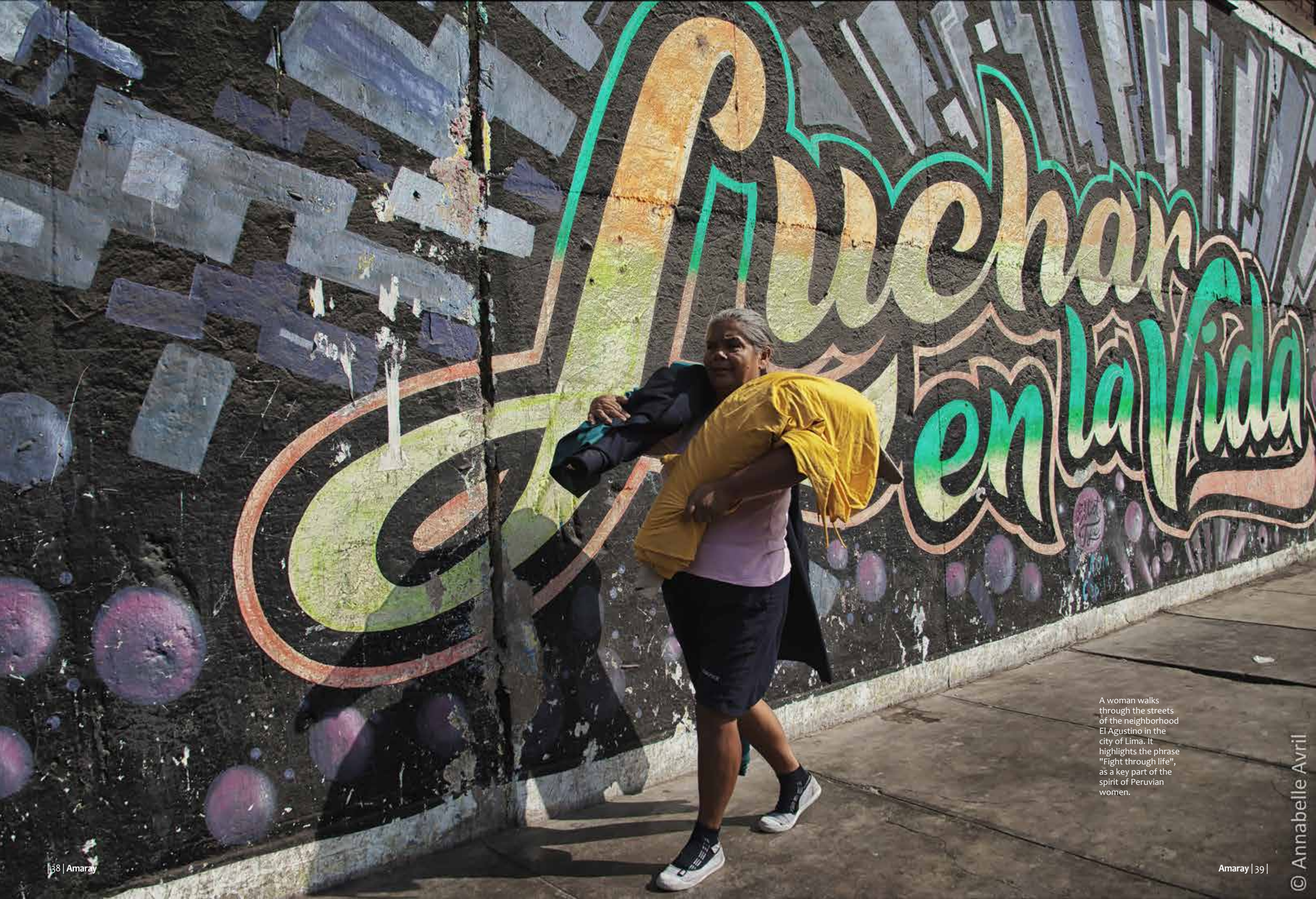
Photographs of Peruvian women in rural areas of Arequipa, Huánuco and La Libertad.



Amaray | 35 |

Annabelle Avril



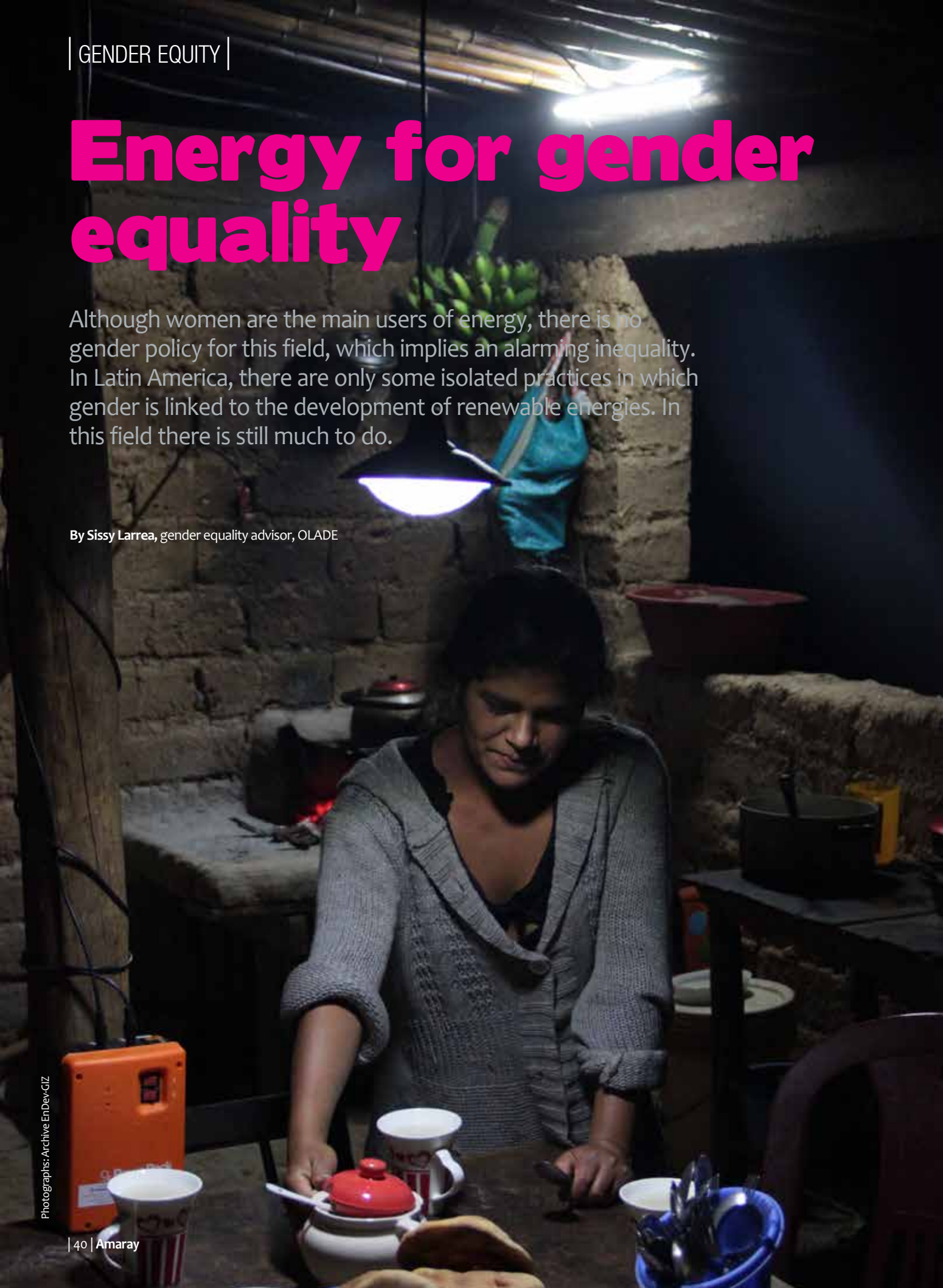


A woman walks through the streets of the neighborhood El Agustino in the city of Lima. It highlights the phrase "Fight through life", as a key part of the spirit of Peruvian women.

Energy for gender equality

Although women are the main users of energy, there is no gender policy for this field, which implies an alarming inequality. In Latin America, there are only some isolated practices in which gender is linked to the development of renewable energies. In this field there is still much to do.

By Sissy Larrea, gender equality advisor, OLADE



When it comes to energy, or rather, the lack of any energy source, the women of the families are most interested in getting this resource. Throughout the countries of Latin America and the Caribbean, we have seen how some energy projects contribute to gender equity, mostly in the context of renewable energy and rural electrification.

However, according to our diagnostics, most of the energy sector in our countries do not have staff trained in gender; do not consider this issue and or have policies, strategies, or energy projects that consider gender equality. We are facing an issue that for many States and countries are merely technical.

By applying gender analysis we can identify in the energy sector, conditions that may be causing inequality between men and women in access to and control of energy resources, environment and development; in the benefit and decision making. This analysis allows us to see clearly how women are major users of energy, either by their different productive tasks (food production or trade initiatives) in both urban and rural areas, or their domestic unpaid work for reproduction of their families.

In rural areas, women are related to agricultural biodiversity, provision of firewood and water, grading seed, food preparation, farming in all production cycles, storage practices, cultural practices (such as pest control), breeding animals (especially smaller species), trading in local markets and traditional medicine for the care of the family. Their tasks are directly related to the transmission of culture and traditions. All these activities involve a number of issues related to energy quality and availability; which is not always possible to obtain due to the energy deficiencies in the countries.

In urban areas, women have joined the labor sector, have continued to be responsible for housework, which means they work long hours to respond to their work outside the home and those who are in household. This is not always recognized and valued and results that women have little time for themselves. These circumstances are not taken into account in energy policies and even less in labor policies. Women in the urban sectors need to solve the needs of their children with few possibilities, lack of formal education, to get better paying jobs, starting businesses or opt for the sector services, such as unpaid domestic workers,

Most of the energy sector in our countries do not have energy projects that consider gender equality.

Two young mothers of the Cajamarca region demonstrate the impact that access to electricity has had on their lives.



often under informal labor relations without social protection or basic rights. For these endeavors and in their daily tasks, having efficient energy sources at affordable costs is essential.

Despite being the main users of energy, they are absent in sectors where energy resources decisions are made, and the opportunities and benefits of industry production and distribution of energy, as it is considered to be an issue purely technical and gender neutral.

By breaking down the tasks of women we see not only that they are overworked and suffer from time poverty to improve their conditions, we also see that there are several gender inequalities are exacerbated by other conditions such as class, ethnicity, sexual orientation, disability or suffer gender violence.

In this scenario, there are interesting experiences linking gender with renewable energy projects or efficient improved cooking stoves; some of these experiences have taught very good lessons and remain successful in improving the health of women and contribute to the efficient use of natural resources. Women's relationship with food preparation is clear and these projects are the most widespread. In addition, there are experiences with solar energy production projects that have benefited from productive enterprises and rural women. Rural electricity generation is another

issue that has attempted to link the two issues, starting from the electricity in the productive enterprises for women, thus promoting economic empowerment. However, these practices are still isolated and few countries have been taken up or appropriated these national policies.

This presents us with some challenges in the region. First, it is necessary that the energy sector understands the need to be sensitive to gender and support projects and policies that are made in oil, electricity, renewable energy. It is important for policymakers to understand that the energy sector is not neutral to gender needs and that every action performed affects men and women in a different fashion. Another challenge is to make the sector more friendly to the participation and work of women in technical and decision making. It will not be possible to shorten the gender gaps if we do not include more professionals trained and sensitive to gender equity in an industry that has been fundamentally masculine.

It should also improve regional statistics when we realize the gaps in access to energy resources; there is also an urgent need for training tools including cases in the region. At a time when several countries in Latin America are talking about transforming their power matrix, it is necessary to have data relating to Gender Power and how the Gender and Women's rights must be considered in energy planning.

There are interesting experiences linking gender with renewable energy projects or efficient improved cooking stoves.



Improved cooking stoves promote the overall quality of indoor environments in rural homes.



A villager shows the decoration of her improved cooking stove in the town of Chiguata in Arequipa.

OLADE

The Latin American Energy Organization (OLADE) was born in the early seventies, in the context of finding new, more equitable economic relationships between more developed and developing countries. Thus, the authorities of the Energy sector, aiming at the joint commitment to the defense of natural resources in the region and technical cooperation on policies for sustainable and comprehensive development and measures to address the crisis in oil prices, began an intense process of political mobilization, which ended on November 2, 1973 with the signing of the Lima Agreement, which has been ratified by 27 countries in Latin America and the Caribbean, whereby its member states make joint efforts for integration of regional and subregional energy.

www.olade.org

LÁMPARAS, PANELES Y ACCESORIOS SOLARES DE FÁCIL USO



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“This continues and no one can stop it”

Julio Montoya, head of the Business Unit Cajamarca of Hidrandina, a distributor of electricity in three regions of Peru, emphasizes the importance of continuing to promote the Safe Rural Home program. Until May of this year, the Business Unit has around 127,000 customers. Of these, 76,000 are in rural areas.

By Carlos Bertello, communications officer, Energising Development Project EnDev-GIZ Peru



How to create new users in rural areas?

Mainly it is the Ministry of Energy and Mines (MEM) which finances almost all the electrification projects, either by themselves or with regional governments, or with the provincial and district municipalities. In addition, Hidrandina also makes electrification projects from its own resources.

What does the arrival of electricity mean to a community?

People of rural areas, who never have had electricity for centuries, find that electricity represents a total change of lifestyle. Therefore, since 2010, together with the German Cooperation (GIZ) and its program

Safe Rural Home (SRH), it began a work to teach the proper use of electricity and provide families with safe electrical installations, since by standard, the liability of the electric company extends only to the meter, with the user being responsible for internal connections.

What activities were done in this context?

Workshops and visits were made to gatherings of people in the communities to teach what is a safe home and how to use electricity safely. In addition, we trained a youth group in various locations to perform the installation work.

Julio Montoya (at center) with workers of Hidrandina in the central agency in Cajamarca.

The company has no obligation to make such efforts and therefore does not have a budget assigned to it. But with the support of the private sector and the German Cooperation (GIZ), we have managed to train many young people in various locations. For example, in our last intervention together with the Association Los Andes (ALAC), we have managed to train 26 young people in 11 communities, to learn how to install a basic electrical kit inner core. Moreover, ALAC has contributed with electrical equipment and donated 782 basic kits that were installed by these young people.

This experience has made these youths into specialists and they have learned that their work is valued, as they have gained a small amount of money for their services. Furthermore, as a benefit, we also see the profit in the project and making such actions is like an investment, since it allows new users increase their consumption.

What about the benefits to users?

People have more access to communications, which is especially evident in young people who have a radio, a television, or small computer. This means a step toward development.

SRH expands the use of electricity. People have started small businesses which has reduced production costs and improved their performance, mostly because they used diesel engines, representing a high cost - five times more than electricity. This has allowed saving and increases their income, thus improving their quality of life.

Have you faced challenges in this process?

We have a limitation. Since distances are so great, then investments are also large to install the power lines and as energy consumptions are low, they do not cover investment amounts. The regulation seeks to ensure that investment is economical and lines are single-phase power, which limits investment by medium and small companies. However, we are seeking to modify this regulation at the national level, so that the service can be three-phase power and so further accelerate development for people with businesses, allowing them to use larger equipment.

Given all these advantages, is there a plan to incorporate SRH in Hidrandina's regular activities?

SRH is already present within the lines of work of the company and is meant to be included as a company policy, through the issue of social liability, which even now the law requires of us. Unfortunately, we can not reach everyone. However, we expect to continue in a strategic alliance with ALAC, GIZ and other institutions, which will allow us to reach more people. This continues and no one can stop it.

Also, SRH usually develops in new places. We conduct meetings in strategic locations where they can bring people of various communities and we

meet up to 200 persons, having wide acceptance and support of the local authorities.

Are there still many areas without electricity in Cajamarca?

There are many villages that still lack electricity. Cajamarca is the department with the lowest rate of electrification nationwide, reaching 68% while other departments come to 80% or more.

How do new users behave regarding payment for electric service?

All the connections that we made are free and we have opted for prepayment meters, because of the great distances. This means that people go directly to recharge centers and receive a code or card for the value of the amount that they have paid. Then they digit this information or the card with this information is inserted in the meter and it automatically activates electricity.

Most meters in rural areas work this way, since it is very difficult for us to go for household measurements and then bill for the service. This would represent a higher cost and the fee does not cover it. Therefore recharging centers are placed near the most strategic locations or points for people to come. Unless their consumption is very high, they only have to come usually once a month. This is a much more effective and economical system for the company.

Do you think consumption has grown in the localities with SRH?

Yes it has grown, but is slow progress. We may still have to wait ten years until the rural area develops as expected, because people are still rooted in their customs and way of life, ignoring the true potential of electrical energy. Some do manage to take the step faster and thus, little by little, the others seek to imitate.

Hidrandina

Hidrandina is a state enterprise linked to the private sector for public service distribution and marketing of electricity in a concession area of 7,916 km², covering the regions of Ancash, La Libertad and 7 provinces of Cajamarca. Furthermore, it also serves other provinces that are outside of the concession, specifically in the department of Amazon, because they are more easy to reach from its geographic location. Therefore, the company is divided geographically into five business units. In May of this year they have around 730.465 customers.

www.distriluz.com.pe/hidrandina

“People of rural areas, who never had electricity for centuries, find that electricity represents a total change of lifestyle”.



The FISE and its contribution to energy access

As part of the "Proposal for public policy to alleviate energy poverty in Peru", the Social Inclusion Fund Energy (FISE) is promoting access to LPG to the most needy in both urban and rural areas, through the "Coupon FISE", thanks which you can buy a tank of gas up to 10 kg at a discount of s/16.00. This way they can access cleaner energy.

By Victor Murillo Huamán, head of the FISE project, Osinermin

The Social Inclusion Fund Energy (FISE) was created by the Peruvian State Law No. 29852 in April 2012, with the purpose of providing natural gas in vulnerable sectors, extending the energy frontier using renewable energy and promoting access to LPG to urban and rural vulnerable people. The temporary administration until 2017, is in charge of the Supervisory Board for Investment in Energy and Mining (Osinermin).

The Fund's resources come from the contributions of the large consumers of electricity, oil and natural gas; FISE thus is financed and carries out energy projects promoted by the Ministry of Energy and Mines, that lend power to the most vulnerable populations in our country; and promote a policy of achieving social inclusion.

The Peruvian government is aware that not having energy sources makes it difficult to access communication services, health, education and various productive activities that require energy. This deficiency contributes to the condition of poverty and vulnerability that continues to be present in many Peruvian homes. For this reason, the State formulated the Plan for Universal Access to Energy, which states that having power is a minimum condition for the development of communities. The plan seeks to develop projects with economic efficiency and environmental sustainability to expand energy access, using the available energy sources.

Aligned in this context, Osinermin-by-FISE Administration has developed a methodological and technical approach to achieve energy access by the population, called "Motion for public policy to alleviate energy poverty in Peru." The project is supported by a technological management tool or Energy Map, which uses geo-referenced information of demand and energy supply nationwide, allowing recording, monitoring, consultation and evaluation of projects and energy resources.

Today FISE has been working on social compensation and promotion for access to LPG, for which we have implemented the "Coupon FISE", through which you can buy a tank of gas up to 10 kg at a discount of s/16.00. These vouchers are given to persons located in the country's poorest rural and urban areas. This way they can access to cleaner cooking fuel, impacting positively on their health and energy costs.

This is achieved with the support of utilities in each region who identify beneficiaries to get the vouchers; the beneficiaries come to the Authorized Agents, gas marketers who receive vouchers as part payment for the purchase of a tank of LPG. The s/16.00 are then reimbursed by the utility.

The Fund's resources come from the contributions of the large consumers of electricity, oil and natural gas.

Beneficiaries of the FISE discount vouchers in Puno.

Desiring to optimize the delivery process and exchange, the FISE Administration designed the "Digital FISE" that is able to reduce costs, paperwork and time. With this technological solution, the Authorized Agent make the transaction from a cell phone via a text message in which it enters the data and the recipient. Upon verification of information, the exchange is done automatically to refund Authorized Agents.. This eliminates many documentary procedures and much repayment time. The transaction time, which was about 15 days, is reduced to seconds.

FISE has contributed in providing cleaner energy to the population for cooking and improvement of the health of vulnerable families nationwide, serving more than 1,719 districts of Peru. To date it has helped more than 659,259 households with Discount Voucher FISE.

PUBLIC ACCESS TO NATURAL GAS BEYOND THE ENERGY FRONTIER

Because of the abundance of natural gas and expansion of the energy frontier FISE plans to finance projects for mass natural gas in 10 Andean cities, through distribution networks and the conversion of vehicles to compressed

natural gas (CNG). The cities where these operations are implemented are: Abancay, Andahuaylas, Huamanga, Huanta, Huancavelica, Huancayo, Cockaigne, Cusco, Juliaca and Puno.

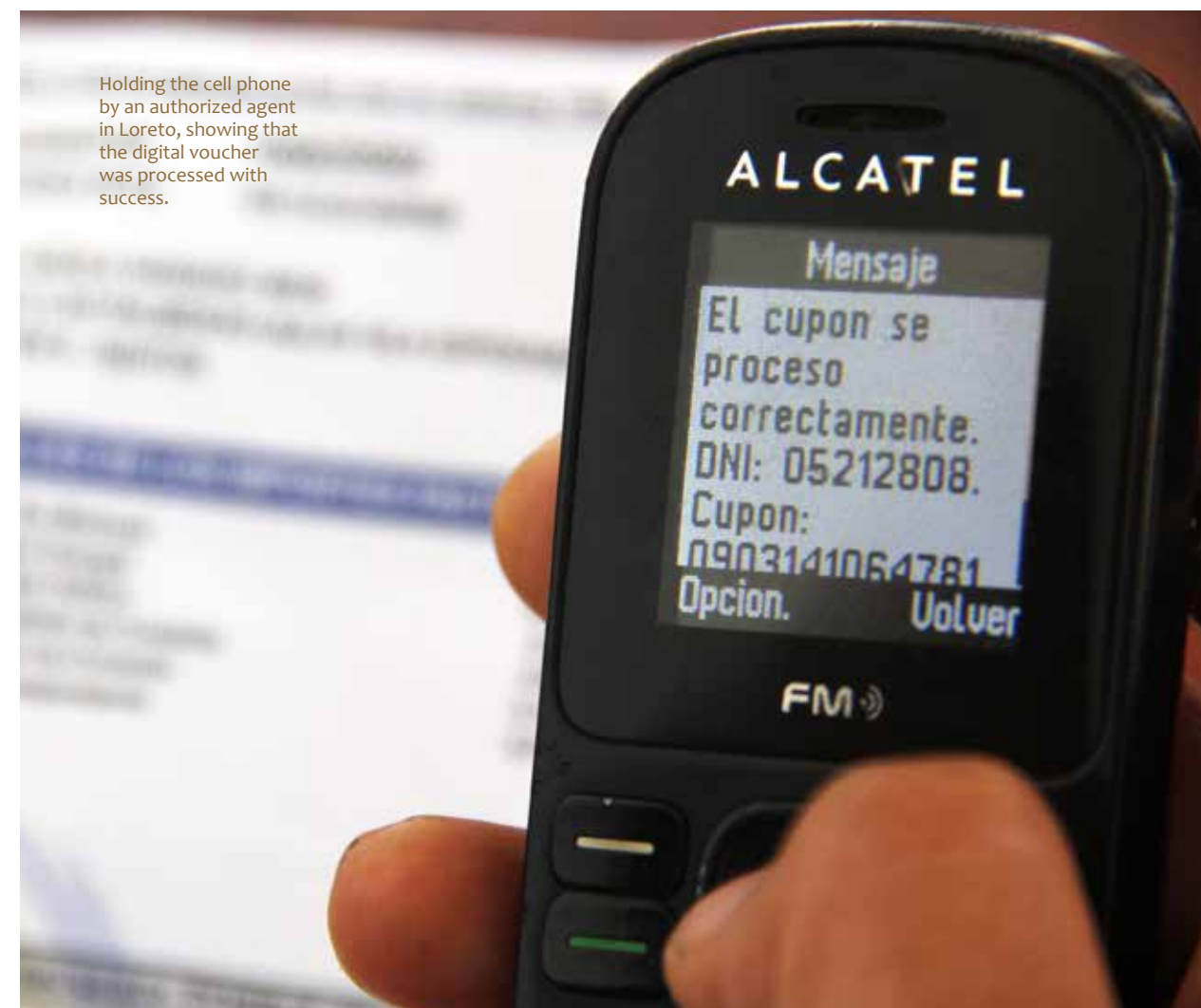
Regarding the Expansion of Border Energy, according to the laws, FISE plans financing projects that promote energy access of vulnerable populations to meet their basic energy needs such as lighting, cooking, heating and communications; provided in the Plan of Universal Energy Access. The plan, prepared by the Ministry of Energy and Mines, considers using available energy and more efficient energy technologies for each basic need identified. Energy projects may be of photovoltaic systems, digesters, mini hydro plants, river generators, river pumps, and even improved stoves.

Finally, FISE - in accordance with the provisions of the same plan - will implement projects to meet the energy needs of people concerning productive uses, which contribute to the development of each area, turning them into productive centers.

Today FISE has been working on social compensation and promotion for access to LPG, for which we have implemented the "Coupon FISE".



Father of a family returning home after getting his tank of gas, using the FISE discount voucher.



Holding the cell phone by an authorized agent in Loreto, showing that the digital voucher was processed with success.

Osinermin

It is the Supervisory Agency for Investment in Energy and Mining, a public institution responsible for regulating and supervising the electric utilities, oil and mining laws to meet their activities.

The organization's mission that the company receives an adequate supply of energy and activities supervised by Osinermin is carried out safely and with care for the environment.

www.osinermin.gob.pe

FISE

The Social Inclusion Energy Fund (FISE) is a mechanism for social inclusion policy aimed at expanding the energy border on vulnerable segments of the population through the mass use of natural gas (residential and vehicular), the development of new frontier in energy supplies and promoting access to LPG.

Currently, Osinermin has the position of temporary administrator of the FISE, ie, which administers the funds generated by the surcharge on the monthly billing for the free electricity users of interconnected systems as defined by the Regulation of the Electricity Concessions Law (Decree Law 25844), through an equivalent energy charge applicable on electrical transmission rates.

www.fise.gob.pe

Healthy schools

An innovative approach to improving rural education through access to energy, ecological sanitation and the use of information and communication technologies.

By Rafael Escobar and Paola Bazán, Energy Program, Practical Action



In Peru, particularly in rural areas, education and health are two key factors that contribute significantly to the improvement of teaching and learning as well as reducing the health problems generated like absenteeism, dropouts and poor performance, which are often the effects of poor health care, especially in children of school age. In this context, the lack of information further exacerbates the plight of education and the school population has limited their opportunities to improve their learning.

In this context, access to energy by educational institutions, although currently showing an interesting development in terms of urban areas, the rural area still shows an important gap in relation to energy. About 14,000 schools in rural areas of the country do not have electricity and 60.8% do not have three basic services (electricity, water and sanitation). Also, 73.7% of primary educational institutions do not have internet access and 63.3% of secondary educational institutions do not have it as well.

Healthy Schools are a gateway technology for students in remote areas.

It is in this context that, through Practical Action, through its Energy, Infrastructure and Basic Services Program has developed a methodology of intervention based on the efficient use of a package of low-cost technologies and of easy maintenance, specifically designed to address the lack of adequate basic services of electricity, water and sanitation. Practical Action also promotes the use of Information and Communications Technology (ICT), through the access to internet and the provision of computer and communications equipment to improve the quality of education in rural areas.

FOCUSING ON THE DEVELOPMENT OF HEALTHY SCHOOLS

The situation described does nothing but confirm that work is essential for healthy schools and secure homes if we are to improve the conditions of life of the poor. This led to Practical Action to implement comprehensive actions for development through its total energy approach and access to services, which aims to promote an integrated technology component to meet basic consumption needs and access to basic services. This program also seeks undertake livelihood activities that allow income generation in the communities, which consequently improves their quality of life.

In this approach, the role of renewable energy, such as solar and small-scale hydro, allows educational institutions access to energy. For example, green dry toilets are an alternative to improved sanitation; and the use of the energy to heat internal environments and have hot water are vital to improving the health of children. Also the use of sanitary landfills allows the habit change to be permanent in children. Finally, the internet access and digital resources provided by ICT encourages a more integrated teaching process.

Besides the technological component, Practical Action encourages the development and strengthening of local capacity through active participation of communities to agree on the best alternatives to meet its main problems and to take advantage of local knowledge in building solutions.

A key aspect of this integrated approach is that it is based on a process of awareness, training and organized participation with communities, Local Education Management Units (LEMU), local leaders, all of whom will subsequently be involved in the management and sustainability of the technology.

All this has meant that we have achieved to date a definition of the concept of healthy schools for Practical Action:

HEALTHY AND SAFE SCHOOL

It is a public space where learning through training workshops and awareness is encouraged, improving the welfare and quality of life of the educated community (teachers, students and parents). These

spaces make available access to energy, water, sanitation and infrastructure, adequate connectivity and ICT, in addition to managing risks. These schools are also part of the LEMU and the Regional Departments of Education.

PROGRESS MADE AND FUTURE PROSPECTS

In 2010, in partnership with the organization Lutheran World Relief, the first project was implemented under the concept of healthy schools. It was in the Chulipampa village in the province of Hualgayoc in the Cajamarca region. This institution has successfully implemented in two schools the program "strengthening capacities for adaptation to climate change by making efficient use water and renewable energy" in the province of San Pablo, where one can perceive the importance of use of appropriate technologies.

Currently, we are developing a program with the Organization of American States (OAS) in the framework of the project "Lights for Learning", in which the alliance with the State through the Ministry of Education is one of the strategic aspects so that Internet access can continue, even after the project has finished. This has been reinforced by previous experience, and by using an integrated approach, it's been achieved provision of these services to various regions and Cajamarca (6 schools), Amazonas (2 schools) and Junin (1 school).

Through these projects, we are developing a replica to implement seven more healthy schools in the province of Cajamarca, which shall be equipped with energy services, water, sanitation and ICT.

This amount of learning and experience makes us sure that this proposal is relevant to the comprehensive development of rural communities and can be promoted and supported by entities such as regional governments, local and private companies.

Practical Action

In 1965, in London, Fritz Schumacher founded the organization Technology Development Group, today Practical Action. In 1985, this international effort began in Peru, with the first international office of Practical Action outside Europe, adopting the name of Soluciones Prácticas.

Its mission is to use technology to eradicate poverty by developing the capacities of people, improving their access to technological knowledge, and working with the population to influence in social, economic and institutional systems that support innovation.

www.solucionespracticas.org.pe

The role of renewable energy, such as solar and small-scale hydro, allows educational institutions access to energy.

Rural electrification in Latin America

Despite efforts to provide electricity to the people of the region, 31 million people, living mainly in remote areas, still lack electric energy. In order to reduce this gap, Argentina and Bolivia are developing innovative projects with clean, renewable energy. The World Bank has launched a program to validate their efficiency and see whether these new technologies may be light at the end of the tunnel.

By Lucia Spinelli, Senior Energy Specialist, World Bank - Latin America.

A family of the district of Cachachi, Cajamarca, showing a pico photovoltaic system.



World Bank - Latin America

A family with a photovoltaic panel in the northwestern region of Argentina.

While electricity coverage in Latin America is relatively high and several countries in the region have been actively working on its expansion, 31 million people still lack access to electricity or any provision that allows them to light in a clean, healthy and sustainable way. For example, Bolivia has about 500,000 homes without coverage and Argentina about 150,000.

In general, most of these homes are in extremely isolated areas with difficult or impossible vehicular access. This renders particularity difficult and expensive any solution involving the transport of medium-sized equipment, for example traditional photovoltaic systems, poles and brackets, batteries, etc.

Technological advances are allowing compact integrated photovoltaic systems (third generation) which ensure, for example, one or more points of lighting and radio or cell charging, needs that are equally relevant in rural areas' development. The batteries of these systems are lithium and substantially smaller and lighter than traditional batteries; they include LED lamps that are also smaller and more efficient than equivalent lighting, and their solar panels are smaller and of lower wattage, but sufficient to ensure the use of the LED lamps and the additional chargers.

This new compact and portable technology presents new opportunities, but also new challenges. In this context, the World Bank is contributing to the understanding of these technologies in the region, evaluating their pros

and cons, as well as the analysis of possible mechanisms for adoption in Latin American countries.

THE PROJECT

Thanks to funding from the Energy Sector Management Assistance Program (ESMAP) -with the support of the project Renewable Energy in Rural Markets (PERMER) for rural electrification in Argentina, the program Electrification for Living with Dignity in Bolivia, Energética and the Alimentaris Foundation- we were able to structure a project of a little over one year, which will assess the effectiveness of these new technologies and solutions for various electrification of isolated and remote areas in the region, where conventional technologies or even standard systems as traditional photovoltaic systems, will not arrive in the medium term.

The project was launched in late May 2014 in the city of Cochabamba, Bolivia, in a workshop organized by Energética. There, various stakeholders in the region related to the topic, shared experiences, homogenized criteria and acquired knowledge about these new technologies. Representatives from laboratories and suppliers, electrification access programs and multilateral and bilateral cooperation institutions attended the meeting.

The ultimate goal is to agree on strategies to improve the quality of life of rural isolated populations by providing them with access to lighting and communication. So, can these new technologies be the light at the end of the tunnel?

Bolivia has about 500,000 homes without coverage and Argentina about 150,000.

OBJECTIVES OF THE PROJECT

1. **Identify** the new technologies available in Bolivia, Argentina and other Latin American countries, which can be used as effective solutions for rural pre-electrification.
2. **Carry out** a series of laboratory and field tests (in different areas of Argentina and Bolivia), on the performance and acceptance of these integrated solutions.
3. **Propose** an institutional model for the adoption of these technologies, so that the solution may be sustainable over time.
4. **Support** the development of the certification process to meet quality standards, considering as reference the Global Lighting initiative.
5. **Develop** a set of recommendations to manufacturers to improve the quality and versatility of integrated solar systems.



Energética

The ultimate goal is to agree on strategies to improve the quality of life of rural isolated populations by providing them with access to lighting and communication.

Latin American Convention held in the city of Cochabamba, Bolivia.

World Bank

The World Bank's mission is to eradicate extreme poverty and promote shared prosperity. Currently, 1.2 billion people lack access to electricity and 2.8 billion use wood or other solid fuels for cooking and heating their homes.

The initiative Sustainable Energy for All promoted by the United Nations and the World Bank, seeks by 2030 to ensure universal access to electricity and modern cooking fuels, double the proportion in the consumption of renewable energy and double the rate of improvement in energy efficiency.

In Latin America and the Caribbean, the World Bank is supporting 14 projects related to energy, both in terms of access, as in issues of energy efficiency, renewable energy and security of supply.

www.worldbank.org/energy

Energética

Energética is a private non-profit institution located in Cochabamba, Bolivia. From an equity perspective, Energética seeks to increase access to energy with equity and efficient use, generating solutions through technological innovation and management, and the training of human resources, thus contributing to improve the productivity and quality of life of disadvantaged Bolivian population and generate environmental conservation.

www.energetica.org.bo

Alimentaris Foundation

Alimentaris Foundation is a Swiss NGO that has been working in Argentina since 2012 on issues of access to energy, water and communications in rural areas.

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