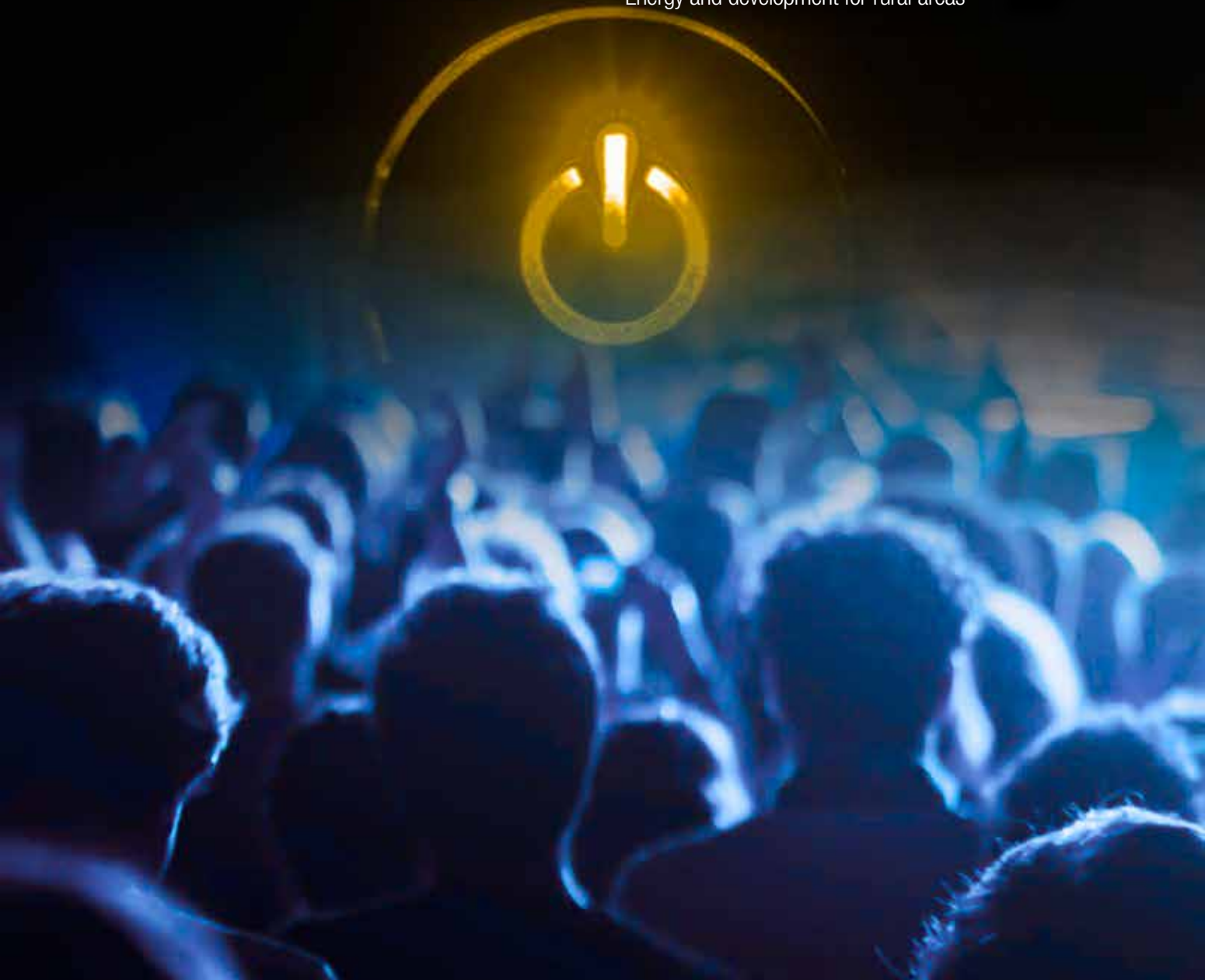


June 2016

# Amaray

Energy and development for rural areas



## Universal access

How can energy reach  
more people?

## Market approach

We present a model that seeks to  
strengthen the supply of technologies.





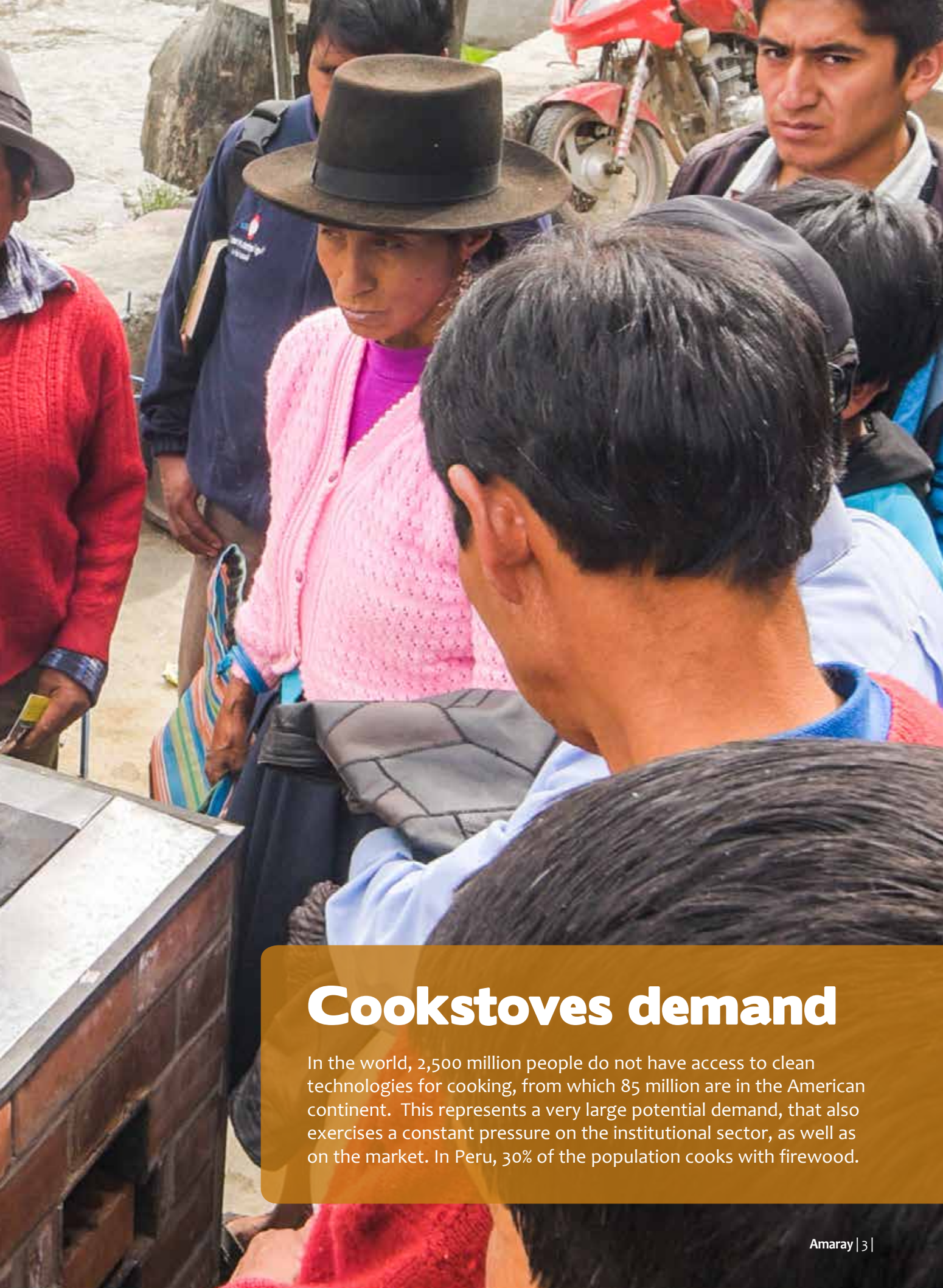
## Lighting demand

If we look at the potential market of energy services in the world, we can observe that 1,400 million people lack access to electricity. This represents an exceedingly great potential demand. In the case of Latin America, there are 30 million people who do not have electricity and in Peru 10% of its population.









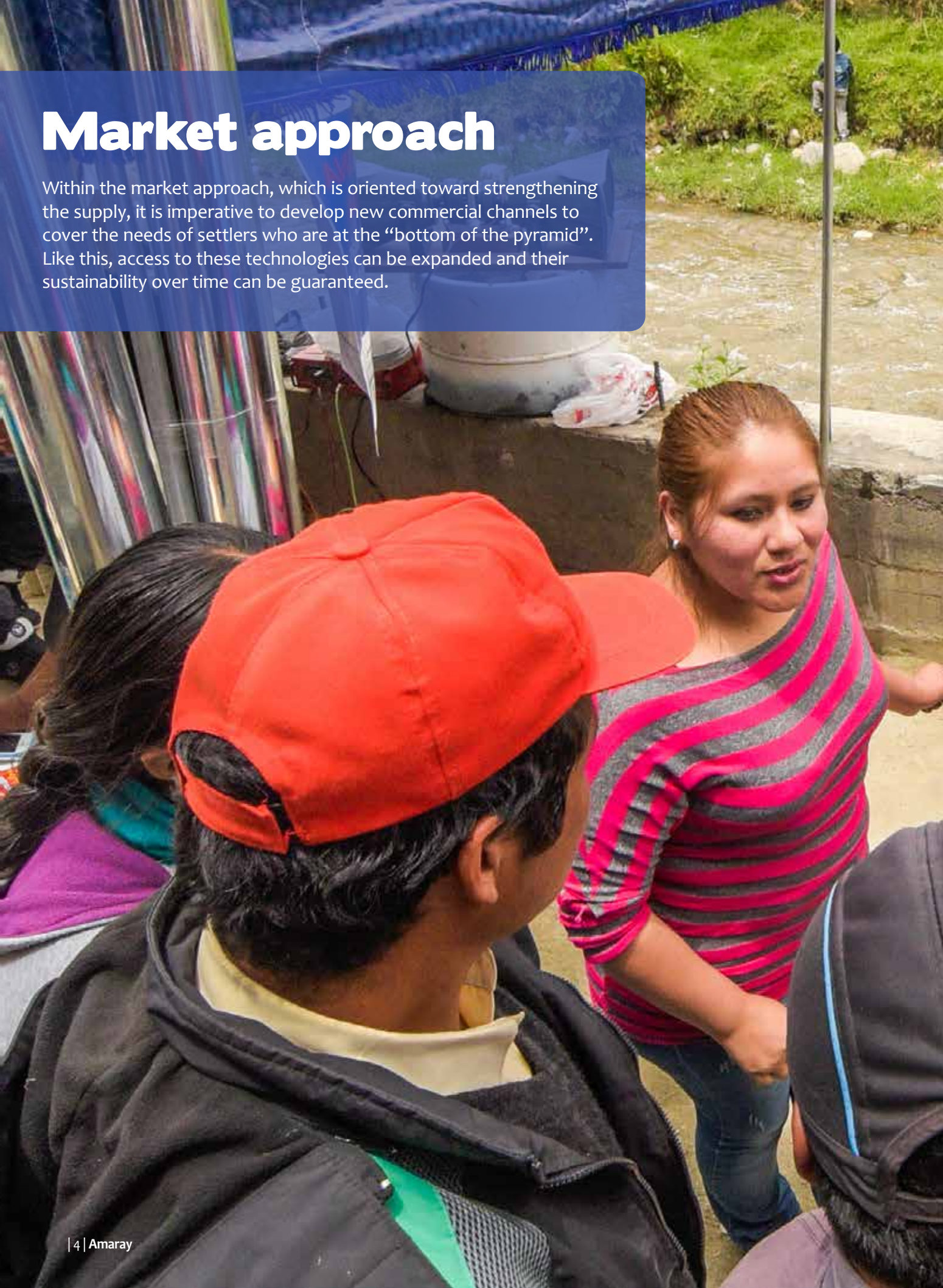
## Cookstoves demand

In the world, 2,500 million people do not have access to clean technologies for cooking, from which 85 million are in the American continent. This represents a very large potential demand, that also exercises a constant pressure on the institutional sector, as well as on the market. In Peru, 30% of the population cooks with firewood.



# Market approach

Within the market approach, which is oriented toward strengthening the supply, it is imperative to develop new commercial channels to cover the needs of settlers who are at the “bottom of the pyramid”. Like this, access to these technologies can be expanded and their sustainability over time can be guaranteed.













“There is plenty of documented evidence that in recent years no country has managed to grow economically and reduce poverty without requiring a substantial increase in the use of energy”.

(Practical Action, 2012)

Dear readers,

There is no doubt that energy is decisive for overcoming social and economic inequality existing in communities, which in turn will allow to preserve the environment. Sustainable Development Goals (SDG, 2015) approved by the Assembly of the United Nations, are clear on their goals to outpace poverty and energy gaps (SDG 7): Ensure access to affordable, reliable and modern energy for all. In this framework, it is important to know the analysis of experts on the current situation: What is missing? Which are the lessons learnt and best practices? What helps to focus more effectively on the energy work?

With the aim of finding answers to those questions, the Energising Development Project EnDev-GIZ Peru, in alliance with the Latin American Organization of Energy (OLADE), carried out 16 consecutive webinars during four months. Definitely an enriching exchange among experts from the Latin American region, in universal access to energy topics, specifically on rural electrification, improved cookstoves and markets of basic energy services.

Therefore, it is a pleasure to present this new edition of Amaray Magazine. We hope, as EnDev team, that these articles allow you to deepen your reflection on the progress and future challenges in the rural electrification field of our countries, as well as in innovative financing mechanisms to promote universal access to energy and the development of the market of technologies for basic access.

I hereby specially invite you to join us with your comments and suggestions in the search of the best strategies to obtain the recognition of being the first continent with universal access to energy.

My regards to you all,

**Ana Isabel Moreno Morales**  
**Director of the Energising Development Project EnDev-GIZ Peru**

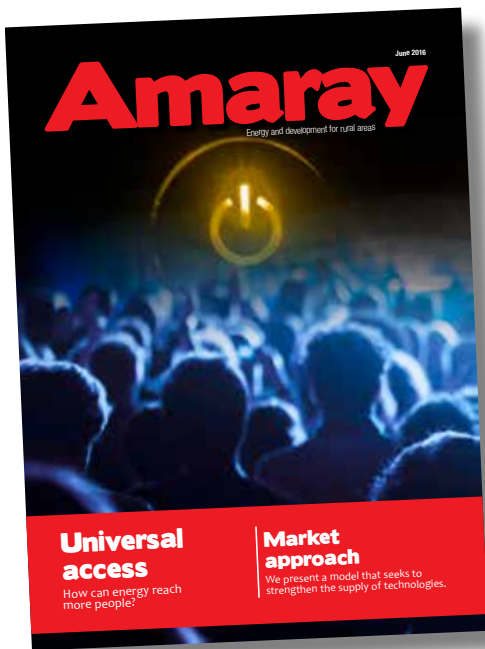
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Special. EnDev and FASERT.  
The market of basic access to energy.

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# Amaray


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Energy and development for rural areas

June 2016, N° 10

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Portfolio. Solange Adum.  
Pictures that connect.

30



# Progress of Rural Electrification in Peru

In the last ten years, the evolution of rural electrification in Peru has made possible to increase the electricity coverage by 50%, reaching by the end of 2015 to 78% of rural population. However, there is still a gap of 22% to address the most remote populations, mainly with photovoltaic systems.

By **Hugo Sulca**, Chief of Programming and Investments Evaluation for DGER/MEM



As for rural electrification, the Peruvian State has the goal to increase the number of people with access to electricity through the implementation of electrification projects, actions in charge of the General Directorate of Rural Electrification (DGER), the Ministry of Energy and Mines (MEM), which was born in 2007, from the merger of the Projects Executive Management (DEP) and the Directorate of Competitive Funds (DFC). Before, from 1993 to 2006, the DEP attended rural areas lacking electricity coverage, noting that at that time, even district capitals lacked said service.

In our country, access to energy presents many obstacles especially in rural areas. The Amazon region is presented as an area of difficult access; not counting the Andean populations, where the remoteness of localities, reduced unit consumption, household dispersion, lack of vial infrastructure and low purchasing power to afford the operation and maintenance of electricity service are added.

Given this situation, the DGER has the mission to provide universal access to electricity to rural areas, contributing like this to improve the quality of life of individuals and reduce poverty. For that, the State is carrying out two types of strategies to revert this situation. On the one hand, the work with conventional systems, through the extension of electricity grids, is still ongoing, which tries to take the maximum advantage of facilities, since many times the factor of consumption demanded by some populations do not require the extension of high voltage networks, but seeks to saturate to the maximum the consumption from medium voltage networks. On the other hand, an alternative that has been used in recent years is non-conventional systems. In these cases the DGER coordinates with regional and local governments, as well as with distribution companies that operate within these territories, for developing interventions with renewable energies such as hydro, solar and wind energy.

**THE CYCLE OF A PROJECT**

Pursuant to the regulations in force, every public investment project financed with government resources must follow the regulations of the National System for Public Investment (SNIP) to be viable. This is a national regulation that has the objective to maintain the order and coordination of public projects, since there are cases where regional and local governments have carried out installations that do not adjust within a more integral planning. Moreover, the

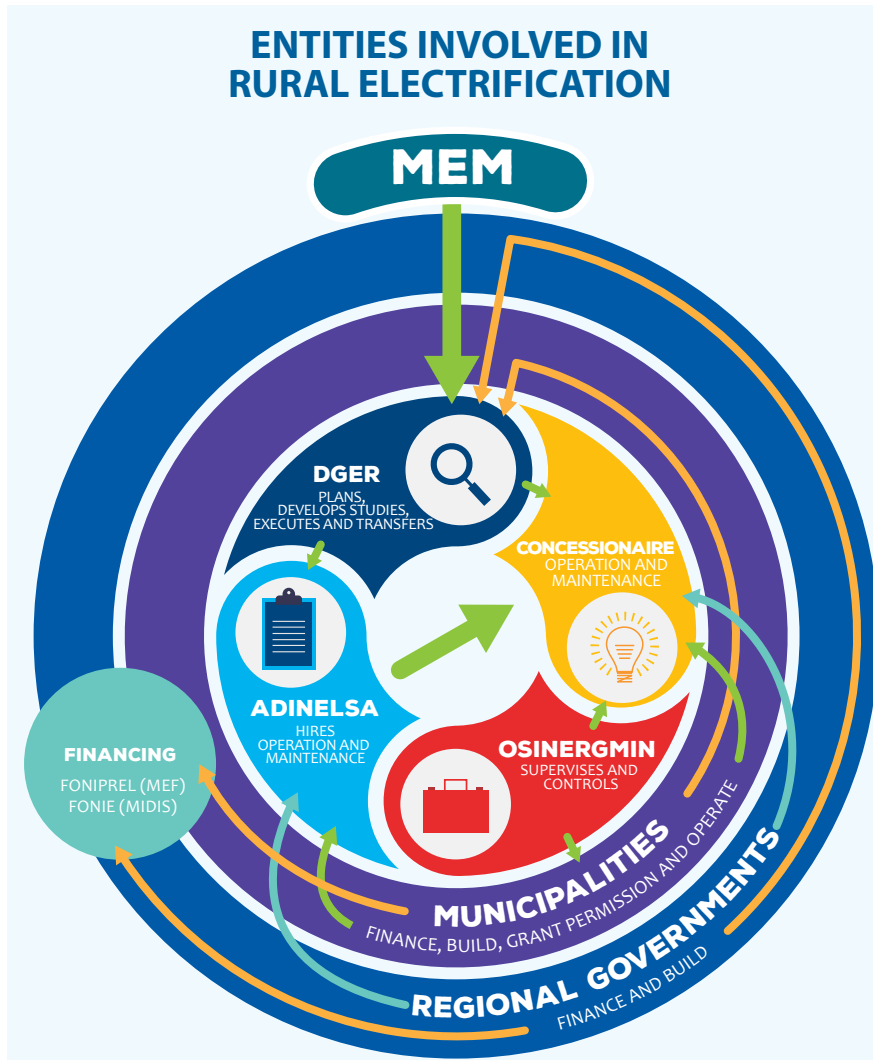
DGER as well as other distribution companies are informed whenever a municipality wants to invest resources in an electrification project, thereby generating an articulated work.

In our experience, an approximate time of 36 months is required to commission an electrical system, since its initial conception, going through regulations as the SNIP and up to its final implementation, either for expanding grids or for photovoltaic systems. However, said time may be extended if there is the need to develop a study for the implementation of a project, especially in most remote areas. In addition, in some occasions there are projects in national parks or intangible archeological zones, so the initiative has to be subject to a greater number of official approvals.

**ENTITIES INVOLVED IN THE PROCESS**

The DGER has the mission to plan, develop studies and implement rural electrification projects in Peru. However, both the elaboration of studies and their implementation are entrusted to private companies during a specific period of time. Then, once works are completed

An approximate time of 36 months is required to commission an electrical system.





Electricity companies, municipalities and regional governments works seek to expand the electric frontier.

Archive EnDev-GIZ



and systems installed, they are transferred to State companies for their administration and maintenance. The Supervising Agency of the Investment in Energy and Mining (Osinermin) is in charge of supervising the quality of the service offered by these companies, as seen in graph 1.

Regarding financing, the DGER is not the only entity managing public resources to implement rural electrification projects, but they are also implemented by district municipalities and regional governments. Thus, in the last years some of the projects developed by local governments were not transferred to distribution companies for their operation, so a type of “mini administration” of the service was created.

Unfortunately, this situation is not beneficial, since in 2001, the Peruvian government issued a law to create the Electric Social Compensation Fund (FOSE), which subsidizes those populations whose power consumption does not exceed 30 kWh-month. Therefore, those works that have not been formally transferred by municipalities, since they did not meet the technical requirements, are in charge of them,

reducing like this the quality of the service and limiting their access to FOSE. Although there is an attempt to regularize the infrastructure of these localities, this situation is still a great social problem for this country.

#### **SITUATION AS OF DECEMBER 2015**

Between August 2011 and December 2015, 447 works have been executed with an investment of 1,300 million soles, by which 9,659 localities, influencing the life of more than 1,400,000 inhabitants, were electrified. For example, In Cajamarca 180 million soles were invested in order to compensate a department that has had a very low level of electricity coverage. Moreover, this seeks to empower population in order to develop projects for productive uses. Similarly, the department of Puno has received an investment of 150 million soles.

It is worth mentioning that there are private initiatives that are intervening in the department of Cajamarca with the intention to contribute to the development of most remote populations, as in the case of Acciona Microenergía, which offers solutions with photovoltaic systems. In this sense,

**Between August 2011 and December 2015, 447 works have been executed with an investment of 1,300 million soles.**



the State runs a similar scheme, understanding that where electric grids cannot reach, it is necessary to come up with alternative systems.

One of the goals for 2021 is to reach the Amazon region. Some areas, like Loreto, present almost inaccessible localities located in the border with Brazil. Another similar case is that of Ucayali where some populations cannot even be reached by river, but only by air. Therefore, for these cases, solutions with alternative systems are sought, which can provide more than 15 hours a day of electricity.

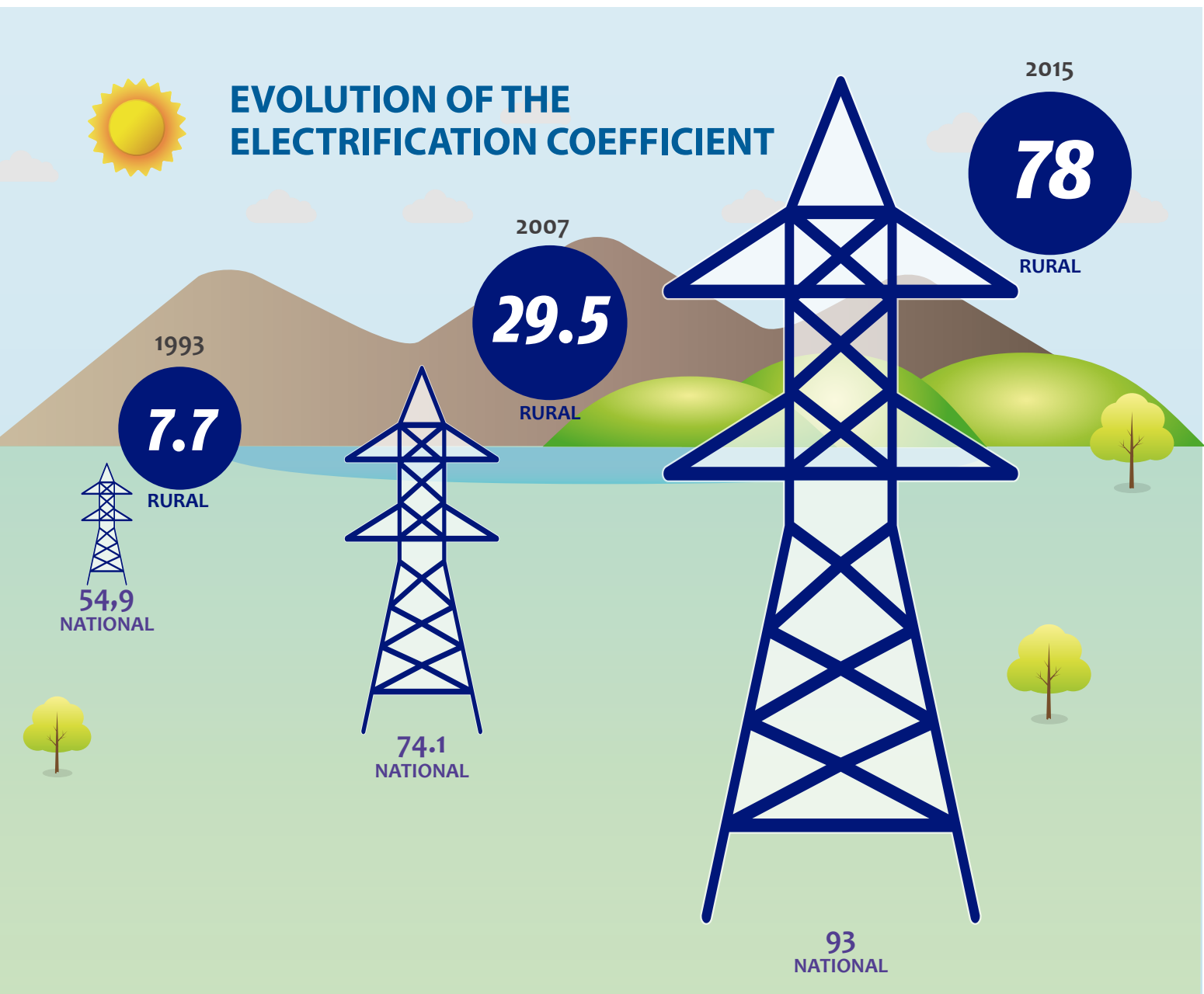
At the same time, a factor that can be identified from these interventions is that the cost of the average rural investment has increased in the last decade. While in the period 2003-2005 the average cost to reach a rural household was 710 dollars, rising to 1,251 dollars in 2006-2008;

recently the cost amounted to 2103 dollars per household for the period 2012-2014. This factor is an indicator that every time reaching more distant households is desirable. As well, these figures are warnings that make it possible to decide when it is no longer viable to continue expanding grids, but to use non-conventional systems.

**EVALUATION AND PROJECTION TO 2015**

The positive evolution of rural electrification in Peru has made possible to raise the rural electrification coefficient from 28.2% in 2005 to 78% by the end of 2015. Thus, we can see an increase of almost 50 percent on rural electricity coverage in the last decade, while in urban areas the increase has been of only 20% during the same period, while in urban areas the increase has been of only 20% in the same period. However, there is still a gap of 22% in the rural area, which represents the most

Since the beginning of activities in charge of MEM the electrification coefficient has maintained a steady growth.





critical area of work. In response, the State has launched an international tender to address most remote populations with photovoltaic systems.

Similarly, in the period 1993-2015 a great breakthrough can be identified in Peru, noting that since the beginning of activities in charge of MEM the electrification coefficient has maintained a steady growth at both national and rural levels (see graph 2). While by 2012, bicentenary of the Independence of Peru, it is intended that the electrical coefficient exceeds 99 percent at both levels. Moreover, the objective proposed for the following ten years (period 2016 - 2025) will require an investment of approximately 4,200 million soles, by which more than 3 million inhabitants

will benefited, and the final goal of bringing sustainable electricity to all corners of the country will be reached (see graph 3).

Finally, it is important to mention that in 2015 the implementation of a new legal framework for distribution and rural electrification was implemented, an element that will consolidate upcoming projects with non-conventional energies, for example, through the creation of a subsidy and an area of technical responsibility for distribution companies. Another favorable element will be allowing the State to assume the financing of domiciliary connections in rural localities that have already been electrified, since in several cases inhabitants cannot afford to pay the cost of bringing electricity to their household.

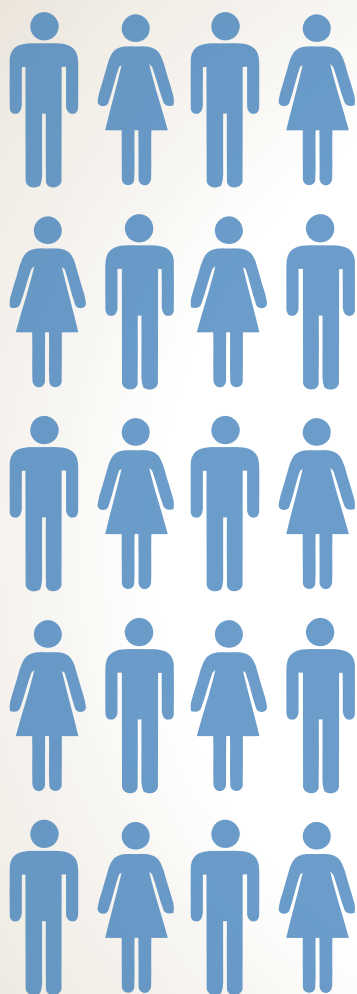
The objective proposed for the following ten years will require an investment of approximately 4,200 million soles.

A beneficial element will be to allow the State to undertake the financing of intradomiciliary connections.

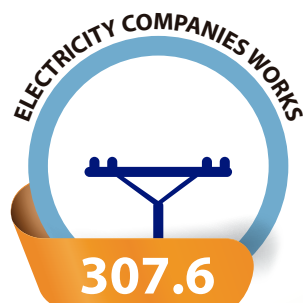
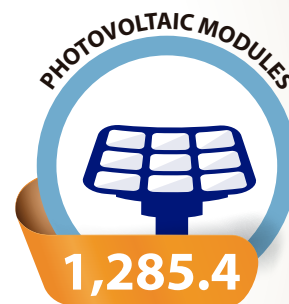
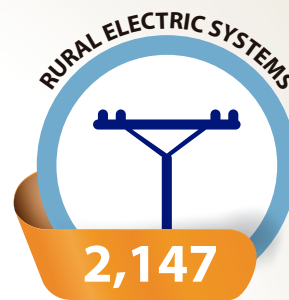
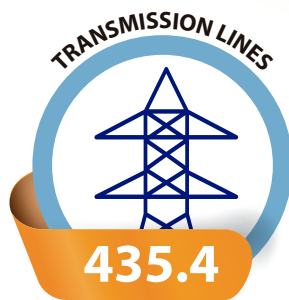




# INVESTMENT AND GOALS FOR THE 2016 - 2025 PERIOD



## PROJECTS IN MILLION SOLES



**3,380,993**  
BENEFICIARIES  
(INHABITANTS)

**4,236.4**

TOTAL OF INVESTMENTS  
(IN MILLION SOLES)

## DGER

The Ministry of Energy and Mines (MEM), through the General Directorate of Rural Electrification (DGER), has competence in the rural electrification field in Peru pursuant to Law N° 28749, "General Law of Rural Electrification", in the expansion of the electric frontier at national level, in coordination with regional and local governments, public and private entities dedicated to these objectives, making possible access of energy to peoples inside the country, as a means to contribute to its social-economic development. Besides, DGER-MEM is responsible for the formulation and annual update of the National Plan of Rural Electrification (PNER), which is a fundamental tool for the design of a State energy policy.

[dger.minem.gob.pe](http://dger.minem.gob.pe)

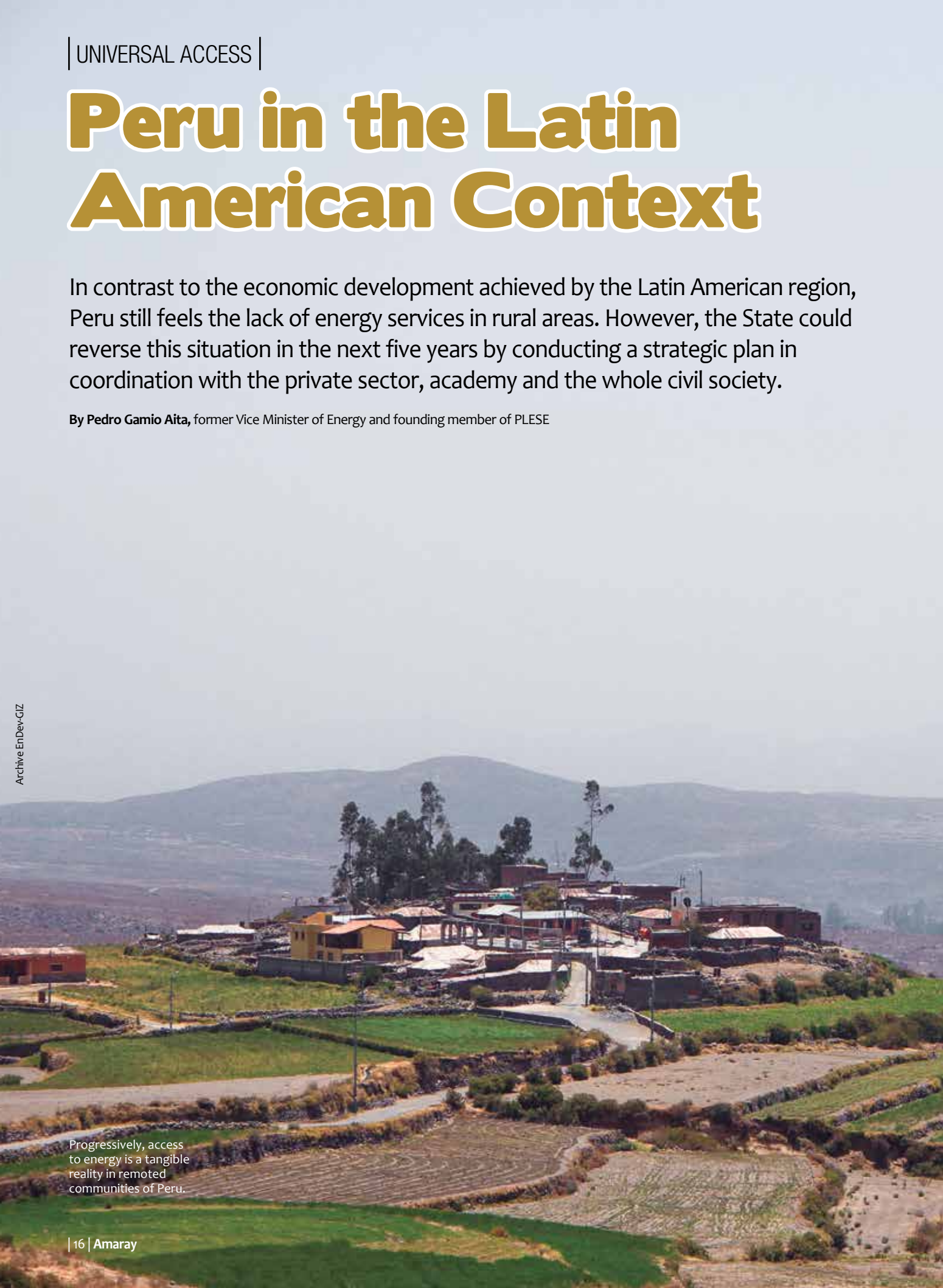


# Peru in the Latin American Context

In contrast to the economic development achieved by the Latin American region, Peru still feels the lack of energy services in rural areas. However, the State could reverse this situation in the next five years by conducting a strategic plan in coordination with the private sector, academy and the whole civil society.

By **Pedro Gamio Aita**, former Vice Minister of Energy and founding member of PLESE

Progressively, access to energy is a tangible reality in remoted communities of Peru.



When we talk about universal access to energy, Latin America faces two challenges regarding its sustainable development. On the one hand, it is not only to change and diversify its energy matrix (at present, almost 80% depends on hydrocarbons), but to achieve total access to energy, this is to say, reach the most isolated populated centers, where the poorest live.

In this way, access to energy is a cross-cutting basic service, which refers not only to lighting or electric service, but to a service that is essential for food and health, food security, education and capacity building, households' improvement, production; in other words, access to energy is presented as a tool for social integration in rural areas.

In this challenge, the traditional way of cooking food in rural areas is a serious problem, which is normally carried out in a closed environment without the appropriate knowledge on how to reduce the amount of wood and clear the smoke outside the household. This is a critical situation affecting the health of several people, but especially children, women and the elderly.

The lack of adequate access to basic energy services generates a very high level of social exclusion, widening the gap between the modern urban and the underdeveloped rural world. In light of this, we should remember that universal access to energy is a commitment promoted by the United Nations that has been included in the Sustainable Development Goals and therefore means an obligation for every country.

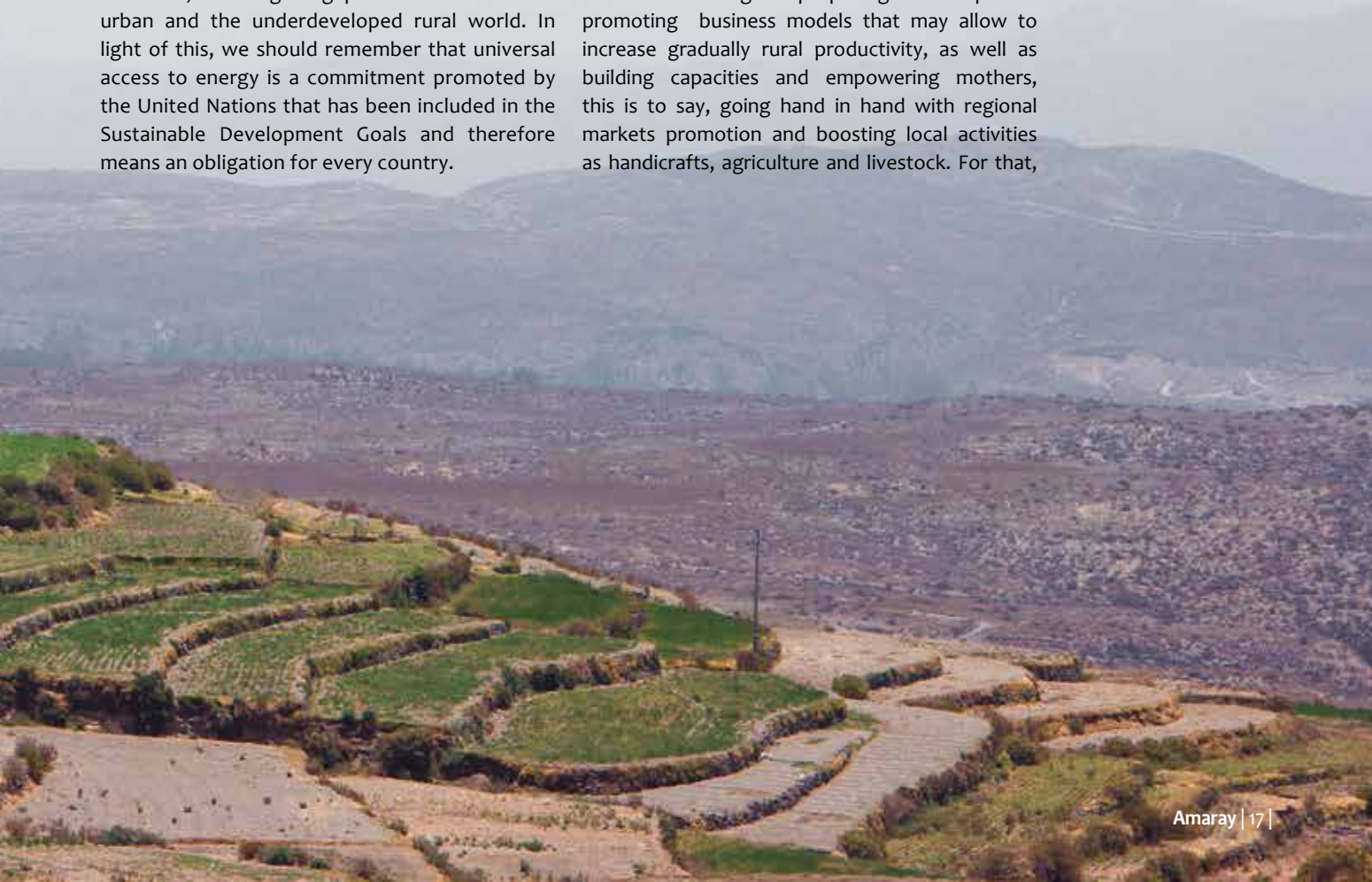
#### THE PERUVIAN CASE

In Peru, due to the Energy Social Inclusion Fund (FISE) and the Electric Social Compensation Fund (FOSE), the State charges fees for transportation lines and pipelines, and accumulated taxes from the payment of the electricity bill of every consumer exceeding a certain level of consumption. In this way, the country is generating enough resources to provide appropriate access to energy to the entire population.

However, the main challenge is to guarantee the adequate management of this resource, which demands, at the same time, to work in a structured way between the public and private sector and the academy. As well, it is necessary to involve the different government levels (national, regional and local) in how to handle this problem and empower local population in the good use of technologies.

In this line of action -and with a view to the coming change of government in mid-2016- we have suggested creating an Agency for Rural Energization, which permits to centralize all programs of energy access, including the correct use of propane gas and methane gas. This proposal, which is supported by specialists, seeks to articulate a chain that develops the supply of appropriate technologies at local level. Likewise, this agency would be in charge of proposing road maps and promoting business models that may allow to increase gradually rural productivity, as well as building capacities and empowering mothers, this is to say, going hand in hand with regional markets promotion and boosting local activities as handicrafts, agriculture and livestock. For that,

The country is generating enough resources to provide appropriate access to energy to the entire population.





strategic planning is essential, which implies the update of rural energy plans, identifying clearly the small, medium and long-term objectives.

It is also necessary to base a regulatory framework to scale up technologies. In Peru, the BT8 tariff for photovoltaic systems has been achieved, although, there are no regulations for microgrids or hybrids systems yet, since up to 11 technologies have been identified to optimize access to energy in remote locations.

The estimated budget for carrying out the objective in the Peruvian case would be 1,200 million dollars in five years; this is to say 240 million per year. It is worth mentioning that, the sum of the FISE, plus the budget allocated by the government for rural electrification, would reach the amount of money indicated, evidently provided that these funds are oriented to the objectives aforementioned. Complementarily, the identification of energy natural resources would also indicate that it is possible to reach the goal of hundred percent of rural families. Hence, we are facing a viable, realistic and economically feasible challenge.

#### DISTRIBUTED GENERATION

Promoting the concept of “distributed generation” would result in a more balanced energy development throughout Latin America. In Peru, this would be due to renewable energy from five main sources: hydro, wind, solar, bioenergy and geothermal energy. It is possible to appreciate the potential of these resources in the graph herein.

Another feature in Peru, which is also common to many countries in the region, is that despite of having significant reserves of natural gas and a huge bank of renewable energy, diesel is still the main fuel for massive use. This means that crude oil or diesel is imported, factor that decreases the quality of air, worsening the countrys' carbon footprint. Therefore, we believe this is a vital factor that should change through a substantial reform, starting with transportation. Having said this, it is essential that the State undertakes an active and predictable role, in a perspective of strategic planning and sustainable development. Also, it is necessary to understand that renewable energies and energy efficiency are presented as options to reduce environmental and energy tensions present in the political and social context of the country.

It is essential to highlight the latent threat of climate change, which places Peru among the ten most vulnerable countries in regard to this phenomenon, which requires resilience and preparation, in accordance with the concepts of mitigation and adaptation.

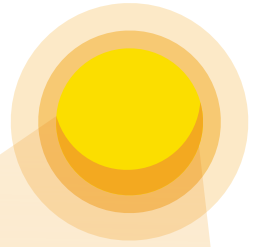
Finally, although Peru is one of the countries of Latin America and the Caribbean with the largest population without access to electricity, this fact is not in accordance with the economic stability faced at present by the country, or with its aspirations, or with its status as member country of OECD. Beyond this, the challenge of universal access to energy is a common task that intends to take energy to all Latin American families.

It is also necessary to base a regulatory framework to scale up technologies.

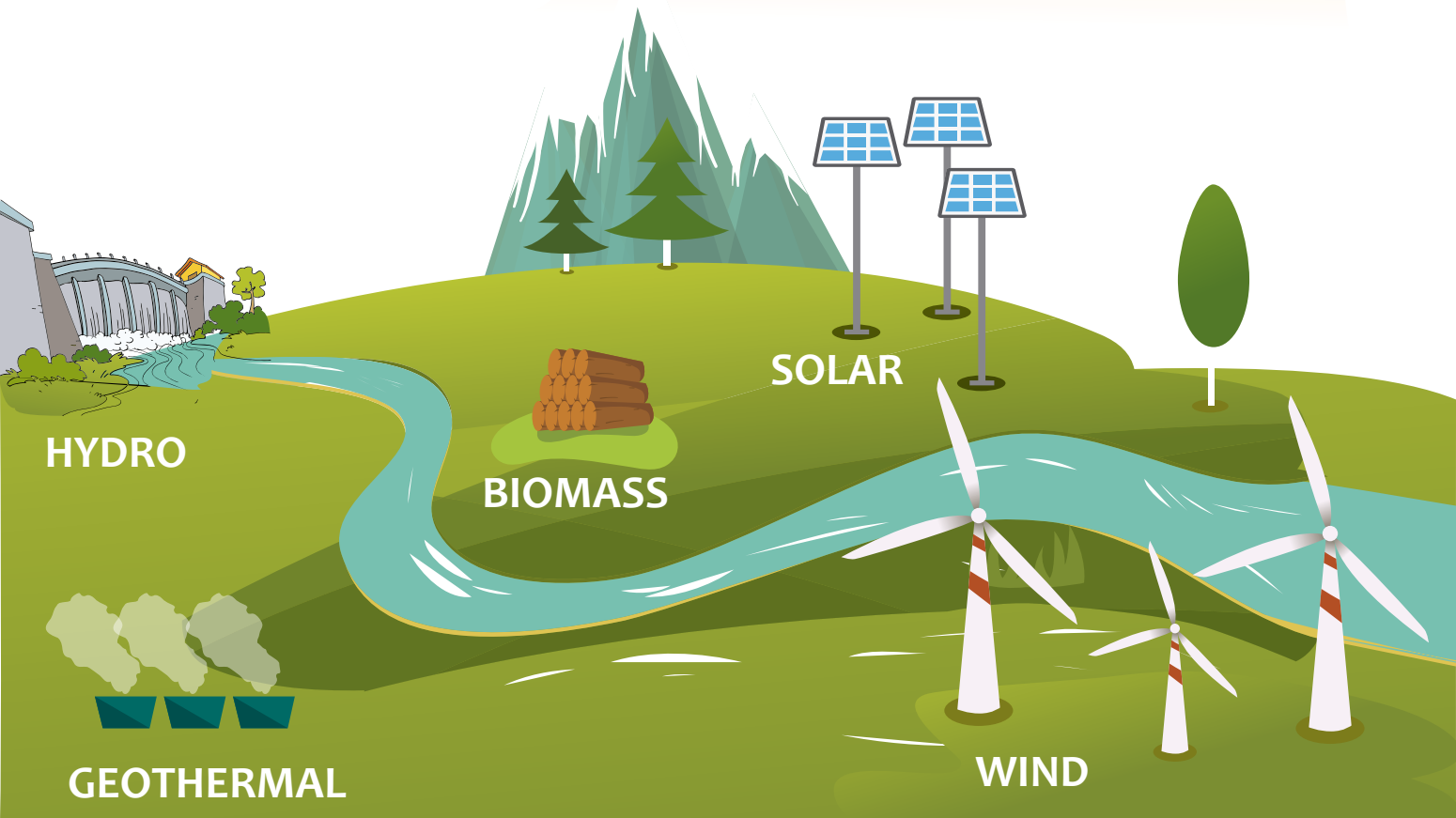
The isolation of several households requires of a strategic planning to provide them with electricity.



# RENEWABLE ENERGIES POTENTIAL IN PERU



RENEWABLE ENERGY SOURCES	ESTIMATED POTENTIAL (MW)	INSTALLED CAPACITY (MW)
HYDRO	69 937	2 954
WIND	22 500	232
SOLAR	25 000	96
BIOMASS	900	27.4
GEOTHERMAL	3 000	0



## PLESE

Despite the efforts carried out to provide electricity to rural populations in different countries in Latin America, there are still 31 million people without access to electricity or any source to access it.

Facing this challenge, in 2012 the Latin American Platform for Sustainable Energy and Equity - PLESE, coordinated by the National Network of Organizations for Renewable Energy - RENOVE BRAZIL was created. Thus, the initiative of civil society organizations from different countries has created this alliance that aims at organizing a continental project that will provide universal access to energy to the poorest and most isolated.

[www.renove.org.br](http://www.renove.org.br)



# The Market of Basic Access to Energy

Archive EnDev-GIZ / PowerMundo

Opposite to the conventional assistance-oriented approach, in which we find a passive beneficiary waiting to be part of the social project, we present a proposal that shows the active role of rural population. In this context, the objective of the cooperation is to strengthen a solid and articulated supply through the market model.

By Angel Verástegui, Senior Advisor for the Energising Development Project EnDev-GIZ Peru





Local technicians serve as retailers of photovoltaic systems in localities of Cajamarca.

From the perspective of the Energising Development (EnDev) project, executed by the German Cooperation, implemented by the GIZ, we begin from the hypothesis that there is a great unmet demand to access better basic energy services. For example, in Peru, 30% of the population cook with wood and 10% do not have access to electricity. Then, analyzing this need and verifying that there are technological alternatives that can attend it; we can conclude that there is a clear “market failure” between the supply and the demand. This would imply that economic agents do not have sufficient and similar information, thereby generating a case known as “asymmetric information”.

At first, we asked ourselves, how the institutional environment is addressing this problem. The answer is that State programs serve directly the settler. In this situation, the supply only plays the role of a service provider for institutions from the environment, every time a program with social purposes is developed. Meanwhile, the direct relation between the supply and the demand tends consequently to be absent. In this way, a “monopoly” from the institutional environment is generated, limiting the possibility that the supply is in direct contact with the demand.

In this context, in Peru, until a few years ago, if a settler knew about the existence of an improved cookstove and wanted to have it; his/her only option was trying to obtain it through social programs. This is precisely the monopoly we intend to break.

#### THE SOCIAL MARKETS APPROACH

According to the market approach, it is necessary to overcome all asymmetric information barriers between the supply and the demand. It is also essential to expand the supply of technologies, pointing towards a retail market, so that any hardware store in a rural locality can offer these products, similarly to as when they offer a flashlight to fight darkness.

This market approach is not a unilateral approach from the EnDev project, but it is framed within a trend that is present worldwide, which is based on the theory of populations that are at the “bottom of the pyramid” (see graph 1). This model is represented by a pyramid whose tip corresponds to classes with higher income, while the base, where most of the world's population is located, is characterized

It is also essential to expand the supply of technologies, pointing towards a retail market.



by having a lower level of income. Specifically, about 4,500 million people live on less than 2,000 dollars a year, which represents “the base of the pyramid”; while 800 million live on 20,000 dollars a year.

In conclusion, it becomes apparent that those traditional markets, which have already been served, are located at the top of the pyramid, including those that are saturated. In contrast, social markets corresponding to the base of the pyramid, which also have a population five times larger, have not been part of the goal of conventional companies.

It is interesting to reflect on the fact that while markets at the base of the pyramid have not been adequately attended, this factor does not imply that poor people are not active consumers, since we have clear evidence that this population has a constant flow of money for food, water, energy, clothing, among others. Therefore, we believe that as cooperation, our work must reside in engaging this potential demand with a technology that provides benefits in the access to energy issue, this is to say, offering products and services specifically designed as well as exclusive channels to reach this type of consumers. An example of this type of initiatives is reduced

containers or “sachets” of coffee and shampoo, which have allowed poor people to access these products. This was a positive reaction of the supply to the reality of less favored classes, as it understood that although an inhabitant could not buy a whole jar of coffee or a bottle of shampoo, the opportunity to buy a fraction of the product was more attractive, making the consumer to allocate a smaller percentage of their daily income to it.

Thus, this was a model for aligning products to the demand of those populations at the base of the pyramid. However, we are convinced that there has not been enough investment in specific services or products to attend this population, or for the creation of specific channels to reach it.

#### STRENGTHENING OF THE SUPPLY

Moving forward in this perspective, we find many learning points that allow to evolve from a conventional assisting approach to beneficiaries towards a social market approach aimed at potential customers (see graph 2).

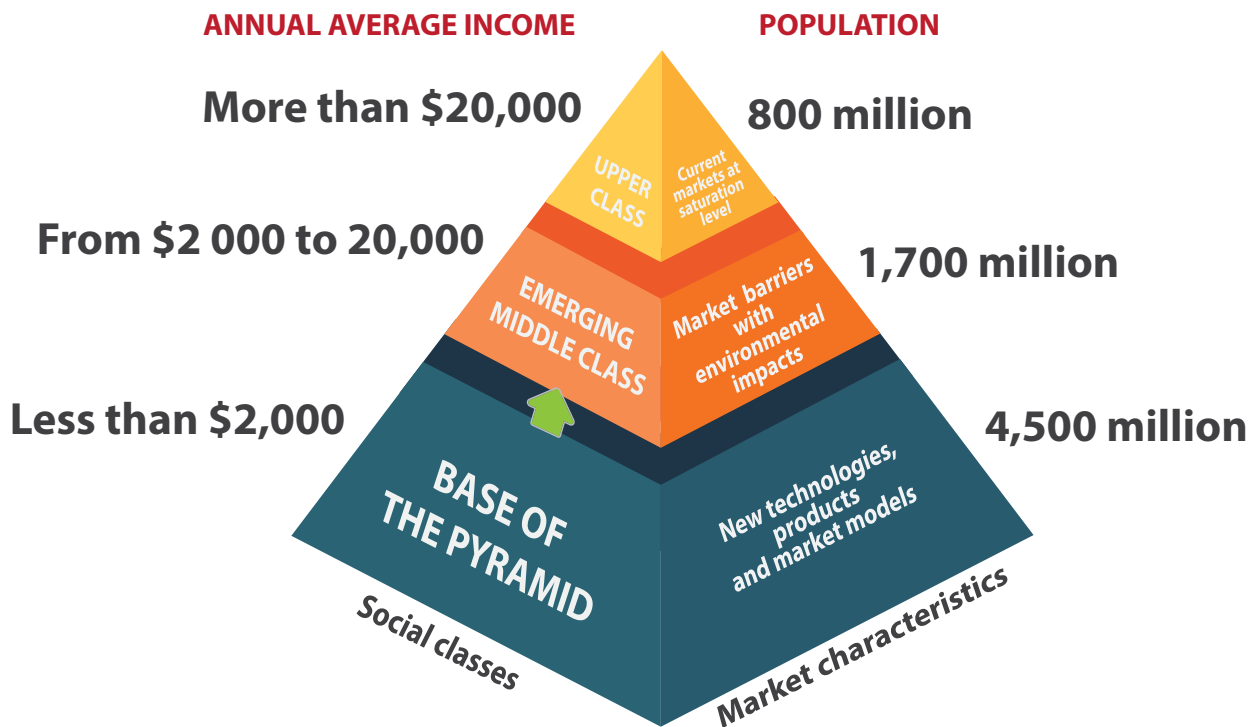
As a first point, we must stop using the term “beneficiary” and replaced it by “customer”, that is to focus on the user as part of a target group, as a company would do. Thus, the rural

About 4,500 million people live on less than 2,000 dollars a year, which represents “the base of the pyramid”.

According to the market approach, people from rural areas may become potential customers.



# MARKETS DISTRIBUTION PER SOCIAL CLASS



settler stops being a passive entity waiting to be benefited, to turn into an active actor who voluntarily looks into the market for the best solution. In this context, the cooperation shall undertake a new role, pro-moting that the supply offers appropriate technologies to meet this demand.

In parallel, we seek that these technologies are accompanied by an efficient technical service, because we know they require attention over time to reach sustainability as it happens in urban households every time a device requires maintenance or needs to apply its guarantee.

Within this promotional approach, it is necessary to expand the standard technological supply to a greater number of alternatives, because while it is true that conventionally we look for one or two technologies that respond adequately to the geographical and social environment to which they are addressed, it is important to allow the market to continue growing towards a variety of options.

In that sense, the objective of the cooperation will be directed towards the consolidation of the supply with existing companies or the development of local entrepreneurs, as from its growth, they would get directly to the population. To this end, the cooperation should promote alliances, for example

with importing companies, trying to create connections and new distribution points at regional level. Moreover, we hope that these temporary alliances, normally given in each project, become solid commercial distribution chains, because we understand that this is the only way we ensure this market model sustainability over time.

Similarly, we propose that any viable subsidies are not used to reduce product cost, but are directed towards market development and commercial articulation, as well as to support issues such as promotion and technological innovation. In addition, it is important to maintain an effective impacts monitoring, by which the consolidation of the after sales service is verified, this is to say, maintenance, spare parts and warranty services, all within the reach of the rural customer.

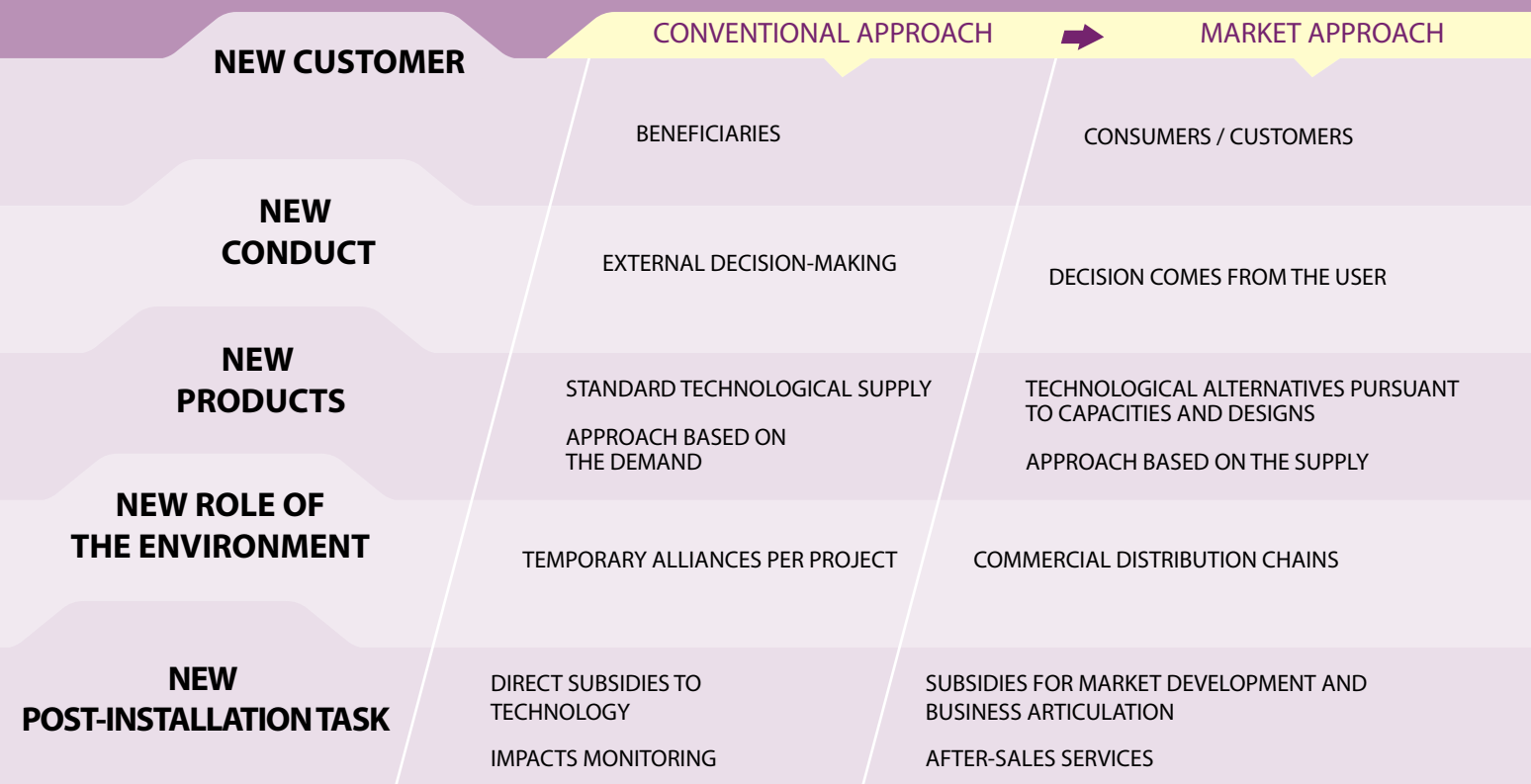
Ultimately, a very important point to take into consideration is that the potential demand of technologies for access to energy has different social aspects, ranging from the extremely poor to the upper class. In this context, the traditional option is to serve the poor through public action from the State, excluding other market segments, as the non-poor.

A proper market approach should consider that the supply shall also meet energy needs that

The objective of the cooperation will be directed towards the consolidation of the supply.



# THE NEW MARKET APPROACH



go beyond economic deprivation, with the aim to consolidate technologies on the market. So, this goes from the demand for emergencies or natural disasters, to the demand for technologies for outdoor recreation activities, walks, etc.

We believe that this is a valuable consideration since this sector may also be interested in acquiring this type of technologies, boosting like this the market development and growth through the consolidation of new companies, that may finally create a branch to attend the poorest.

The role of the cooperation should not be limited, and may take the entry of these products to sector markets with greater resources as a strategic option. In other words, encouraging market actors that are interested in attending both demands and that allow the development of the market at all levels.

## CONCLUSIONS

Today in Peru, two million households cook with wood and the country has only 300,000 clean cookstoves installed due to social programs in recent years. Meaning, there is an unattended demand of 85% of the population. This is an opportunity for market development.

Within the traditional welfare dynamics, the settler becomes part of a social program

in order to have a cookstove in a specific region, action that generates a localized and staggered growth with long periods of inactivity. In comparison, a business initiative would mean continuous growth that would not depend on projects, but the decision to buy a cookstove will be taken on a daily basis throughout the country.

In EnDev, while we are interested in developing market logic, we still believe that it is vital to carry on with our joint work with the State, so that this type of projects is included in the national agenda. We must also continue promoting joint public and private alternatives, such as current rural electrification on a regulated market, in which the State assumes the cost of basic infrastructure; concessionaires are responsible for the operation and maintenance; and eventually the user pays for the service.

In this way, a favorable regulatory framework will continue to be generated and knowledge of other technologies within the institutional environment will be expanded. As well similar markets related to other energy services could be generated, as for example cooking food or heating. Precisely, these actions allow continuing shortening the existing information gap, encouraging villagers to buy the technology directly. In terms of the demand, we propose to continue with information and education initiatives.

The cooperation may take the entry of these products to sector markets with greater resources as a strategic option.

It is essential that companies promote their products among rural population.





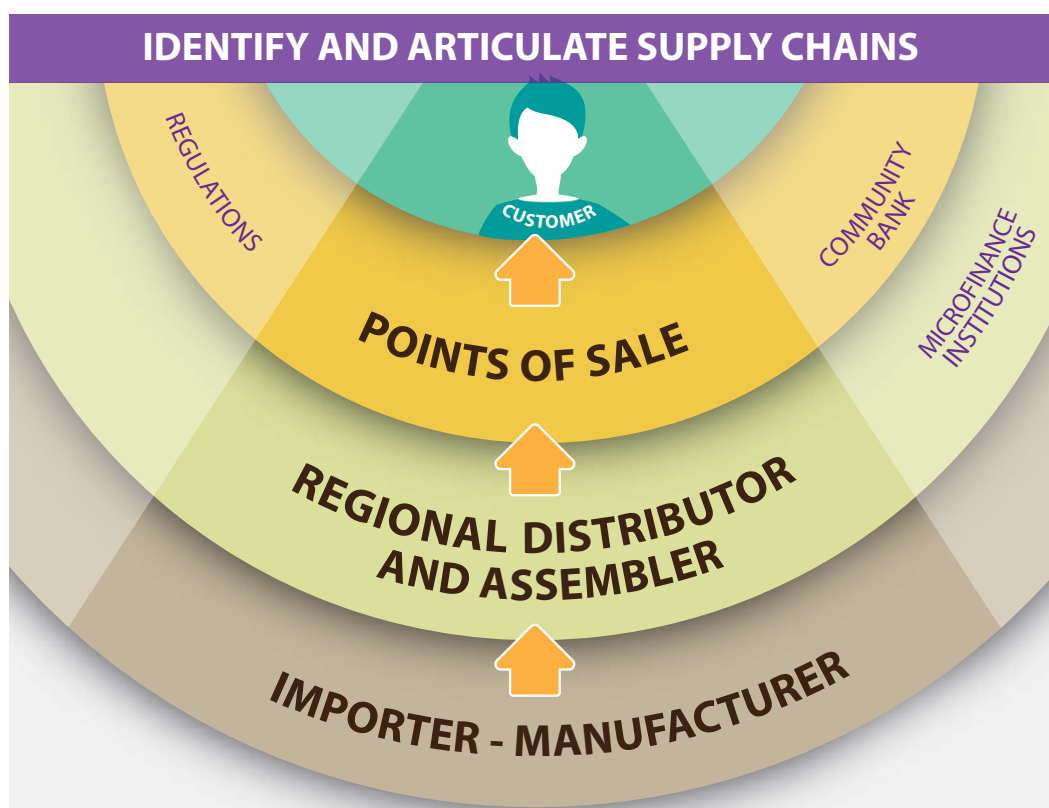
Finally we want to emphasize our goal of strengthening our work on the supply, for which we propose actions such as capacity building, strengthening of entrepreneurs, promotional activities as well as distributors identification and marketing channels (see graph 3).

Likewise, it is also essential to maintain the drive towards innovation, for the range of products that meet the needs of the population continues to expand. In that sense, making an analogy with transportation, it is our challenge to offer not only “Mercedes” to the settler, but also motorbikes and bicycles, thus not doing so, will condemn the user to

the dichotomy of getting a Mercedes or going by foot. For that, the user (and not the institutional environment) shall be the one that chooses the ideal level of investment and profit to cover his/her energy needs.

These actions will strengthen the relation between the supply and the demand, so that the cooperation can gradually retreat, once the aim of consolidating a sustainable business relation with good quality standards is achieved. It is worth mentioning that in this case, sustainability does not refer to a project or a number of installed systems, but it is guaranteed through the market itself.

It is essential to maintain the drive towards innovation to continue expanding the products' range.



## EnDev Peru

The Energising Development Project (EnDev) is a program of access to energy financed mainly by the governments of the Netherlands and Germany, which aim is to provide access to energy to 14 million people around the world, being the German Cooperation, implemented by the GIZ, the executor in most of the cases.

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[www.endevperu.org.pe](http://www.endevperu.org.pe)

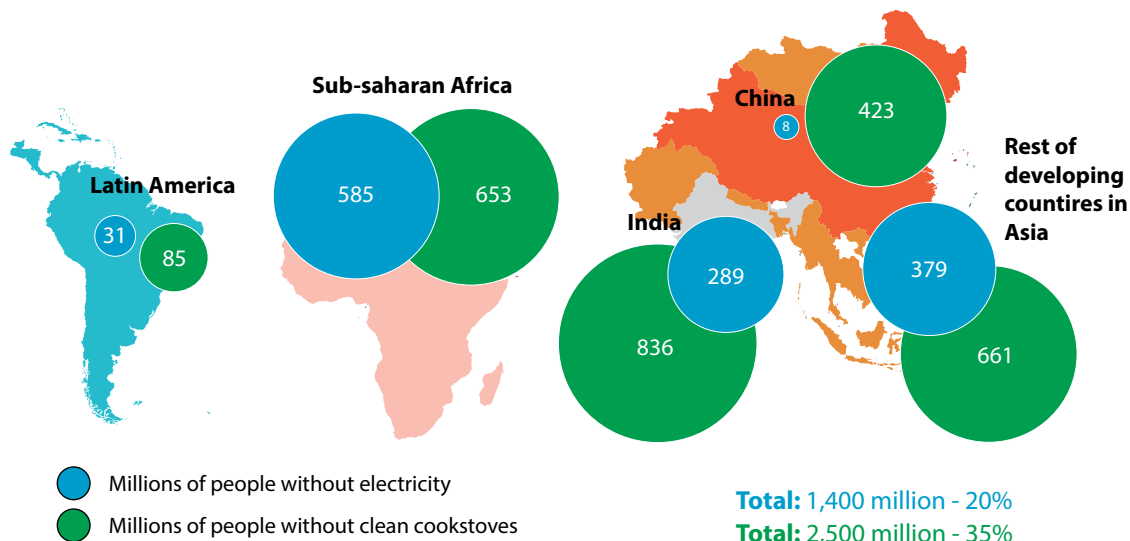


Marketing and sales activities shall be developed periodically in populated centers.

Carlos Bertello - REEEP

## ENERGY POVERTY BY REGION

If we look at the potential market of energy services in the world, we can observe that 1,400 million people lack access to electricity and 2,500 million people do not have access to clean technologies for cooking. In the case of Latin America, there are 30 million people who lack access to electricity and 85 million people without access to technologies for cooking. This represents an exceedingly great potential demand.



Source: World Business Council for Sustainable Development



# A strategy for boosting the market

As part of this special focused on market development, we present the contribution of FASERT, which provides financing to promote the improved cookstoves market in rural areas.

By **Angélica Fort**, National Technical Coordinator for FASERT-IICA

The general objective of the Fund for Sustainable Access to Thermal Energy (FASERT) is boosting the value chain of thermal renewable energy technologies (TRET). In that sense, its main component is a nationwide grant fund that offers non-refundable resources to co-finance projects that promote access and dissemination of TERT between rural and peri-urban populations.

The Fund is the result of the alliance between the Inter-American Institute for Cooperation on Agriculture (IICA) and the global initiative Energising Development (EnDev), executed by the German Cooperation, implemented by GIZ in Peru, to promote sustainable access to modern energy technologies and services, in which thermal renewable energy technologies are the starting point.

The intervention strategy for boosting the market consists on:

1. **Strengthen the supply:** training local suppliers of certified improved cookstoves in business, technical and financial aspects that enable them to provide quality products and suitable after-sale services.
2. **Strengthen the demand:** introducing the technology to potential users and raising awareness on the economic, social and environmental benefits.
3. **Promote the participation of financial institutions:** so that they can offer suitable financing to acquire technologies.

As a result of the first contest, FASERT has executed five projects of improved cookstoves through five entities, achieving a sale of 2,258 cookstoves. These projects have been implemented in seven regions of the country. Below you can find two of these experiences.

As a result of the first contest, FASERT has executed five projects of improved cookstoves.

## Microcredits for rural coffee farmers' organizations in Cajamarca

### Executed by Practical Action

The objective of the project was to promote the purchase and efficient use of certified improved cookstoves in rural areas of the provinces of Jaen and San Ignacio in the region of Cajamarca. Thus, from a training developed by SENCICO and with the support of Practical Action, accredited installers were formed, who at present are installing Inkawasi Pichqa certified improved cookstoves, model developed by GIZ.

**The supply:** 36 installers and rural promoters were strengthened and moreover three improved

cookstoves manufacturers formed a consortium to expand their intervention scope.

**The demand:** the project was aimed at families that produce coffee. Thus, 2,000 families received information on social, economic and environmental benefits and other 1,000 families were made aware through workshops. When the project was completed, 600 of these families implemented improved cookstoves in their households.

**Financing interaction:** it was possible to involve Cenfrocafe, Bosques Verdes cooperatives as well as Ahorro y Credito cooperative. In addition, other cooperatives as Global Cafe and Coopac Norandino are interested in this initiative. Also 524 microcredits with prime rates between 10 and 12% per year were granted to small organized coffee farmers.

“There are people who lack the spirit of saying: yes, I can. I decided to enter the project, which was imaginably for men, but I wanted to support my family and this project motivates women to stand out”.

Gladys Baldera, entrepreneur.

## Financing of improved cookstoves for Savings and Credit Unions

### Executed by Cofide

The Savings and Credit Union (UNICA) is a civil association formed by a group of 10 to 30 families from the same community, which support each other on the management of economic and social activities (savings and credit services to its members).

In this context, the purpose of FASERT was to enable access of UNICAs to the improved cookstoves market. For that, financing mechanisms were established for the acquisition of improved cookstoves and promotion of joint work with local suppliers.

**The supply:** 12 distributors have strengthened their capacities in the region of Lambayeque and 16 in Ayacucho. This involved technical, business and customer service aspects.

**The demand:** 17 inhabitants were trained on gathering monitoring information in the department of Lambayeque and 13 in the department of Ayacucho. In addition, 120 UNICAs were made aware in the department of Lambayeque and 193 in Ayacucho. As a result, 317 improved cookstoves were installed.

**Financing interaction:** credits by UNICAs were adapted to a prime rate of 1% for “green credits”. Thus, from 317 improved cookstoves sold, 195 were acquired through a financial product.

[www.iica.int](http://www.iica.int)

[www.fasert.org](http://www.fasert.org)



# Pictures that connect

“Life involves bonds that connect different beings: some need others to live and that, somehow, makes us lose part of our unique essence. Life is seen as plural, as constant contact that connects us to a greater whole, which is the ecosystem of which we are part.

To photograph that plurality and vitality, Adum has elaborate delicate photomontages, from three to seven photographs each. The result: landscapes that hint at the exuberance of life. The exchange of energies gives us the evocation of being alive, and at the same time diminishes our particularities. Like this, we generate another life, but collective”. (From the series: Forest)

Similarly to the photographs presented in this section, the development of a country in a globalized world grows from the communion of efforts, as well as from the expansion of ideas and images. Thus, in the pursuit of common welfare, we can perhaps visualize cooperation as a means for generating new connections and alliances, for example, in their quest for consolidating spaces that encourage the exchange of technologies for the development, initiative that finally urges to consolidate sustainable access to energy for all Peruvians.

“I am from a country referred to as a developing country. In Peru, although we have had improvements in our economy compared to previous decades, our state organizations, which are related to education and culture, cannot fully cope due to the lack of capital investment.” (Artist statement)

**Solange Adum** is a Peruvian artist, who studied at Corriente Alterna School of Fine Arts and Pontifical Catholic University of Peru, and then fulfilled a professional career at Centro de la Fotografía. Later, she completed a Diploma in Contemporary Artistic Photography in Node Center, Spain, as well as a Diploma at the Pedro Meyer Foundation in Mexico.

At present, Solange is committed to work as independent photographer for different companies and Peruvian magazines, while she teaches at Centro de la Imagen. In the last years, she has presented two individual exhibitions and has collaborated with various art fairs and collective expositions. Furthermore, she is the author of different photographic research publications.

[solangeadum.com](http://solangeadum.com)





# nnect

From the series: Forest



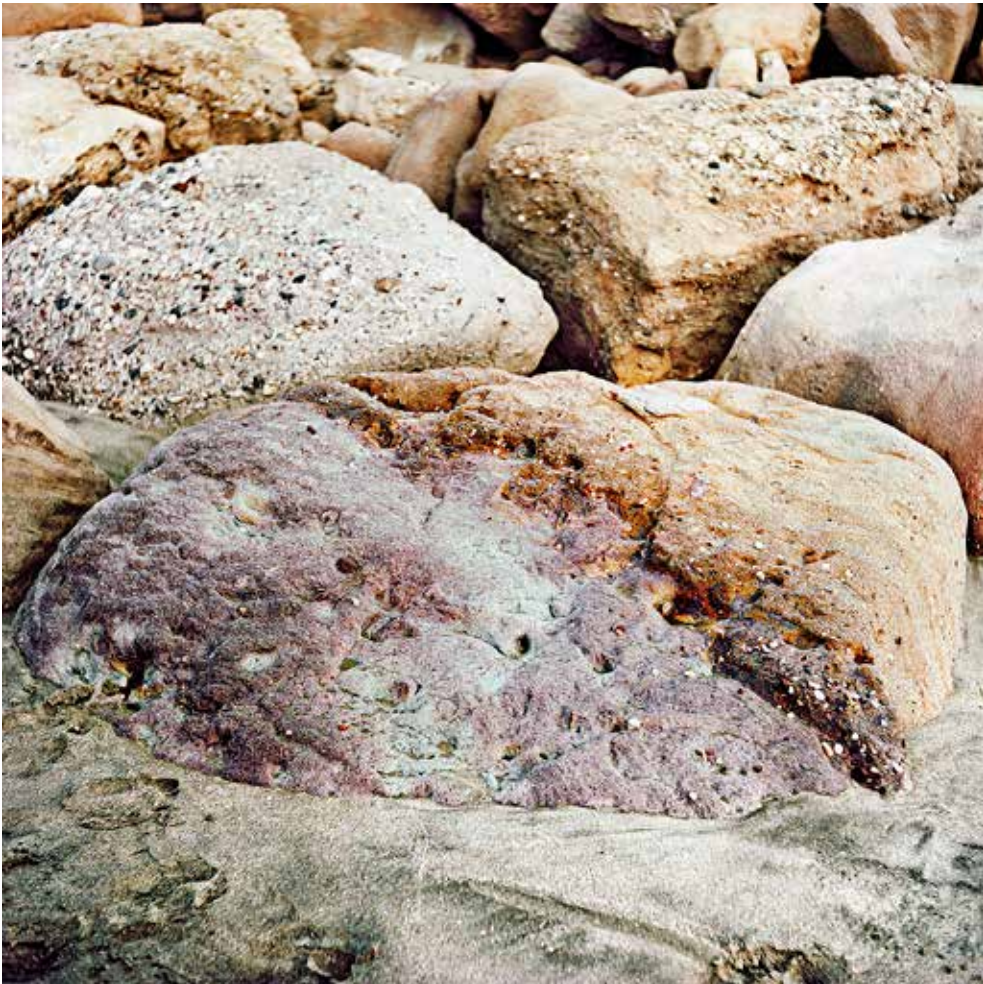




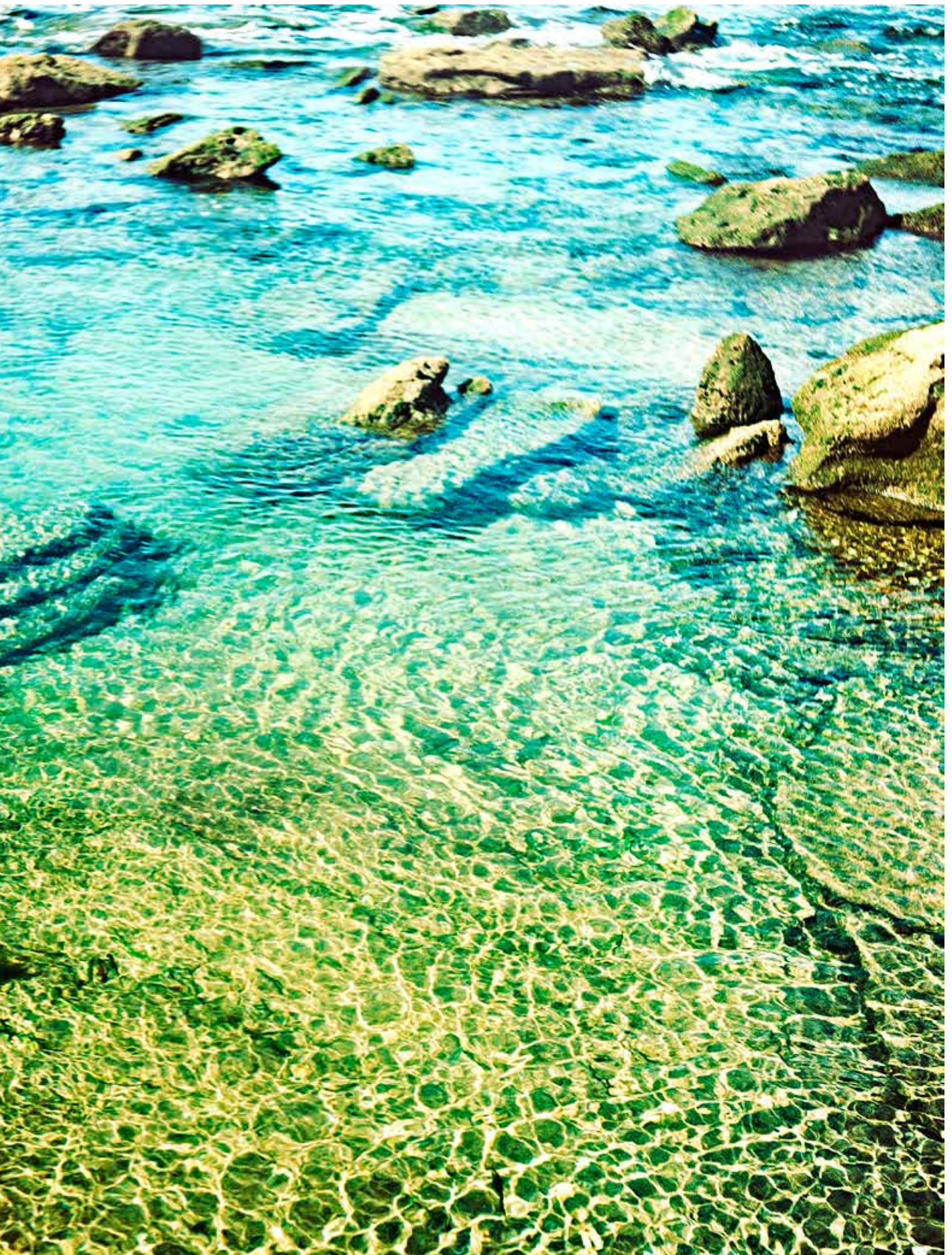














# The Network Experts' Experience

The Latin American Energy Organization has developed an important virtual space that promotes the transmission of knowledge through debates in the energy topic. To date, 3000 participants have been part of this worldwide experience.

By Pablo Garcés, Fabio García and Marcela Reinoso, advisors members of OLADE

The Latin American Energy Organization (OLADE) is an intergovernmental public body established by the Agreement of Lima on November 02, 1973, ratified by 27 countries members of Latin America and the Caribbean. As well, it has the special membership of Algeria as a participating country.

Among its articles of incorporation, OLADE has the mission to contribute to the integration, sustainable development and safety of the region's energy, by giving advice and promoting cooperation and coordination among their member states. In addition, the following objectives are included in its strategic direction: "contributing with the strengthening of management abilities and the development of the energy sector", as well as "promoting energy research and technological development and region innovation", using as mechanisms the exchange of expertise and technological knowledge diffusion in the field of energy. In virtue of the aforementioned, OLADE has developed and maintains running its Network Experts Knowledge Platform, which is an open virtual space of transfer.

## NETWORK EXPERTS

The platform Network Experts has positioned as the most important process of interaction, socialization and knowledge in Latin-America, covering eight specialized sectors: hydrocarbons, energy integration, energy and access, gender and energy, energy efficiency, renewable energies, climate change and electricity.

In this forum, experts from public and multilateral bodies, private advisors, academic and researchers participate actively. Likewise, each of the

specialized sectors forms a thematic network nurtured with official information from ministries or energy agencies from OLADE's member states, researches from multilateral bodies and through case studies from reliable sources.

Each network manages an editorial line adjusted to the context and current interests of the energy sector in Latin-America and the Caribbean, without neglecting any global relevant information that may leverage sustainable energy development in the region. As well the platform storages, categorizes and promotes the transfer of knowledge through different tools, which are: news, virtual debates, documents, events, resources, surveys and discussion forums.

Within this context, it is worth pointing out the active participation of nearly 3000 participants from America, part of Europe and Africa in virtual debates (webinars), which have become a very versatile tool to share experiences, lessons and impacts of the actions taken by the energy sector pointing towards the well-being of people. Like this, we in OLADE feel as part of our mission making specialists to discuss about their reality, challenges, risks and opportunities in the energy sector through forums.

## A GLANCE TO THE ENERGY SECTOR

To date, information stored in Network Experts shows that in the Latin-American region different strategies to increase both access to energy and energy efficiency are used to obtain more penetration of renewable energies. Some of these strategies are tenders, funds, incentives and market mechanisms. Furthermore, the drive of technology transfer to biomass, geothermal, wind and solar energy is highlighted. Regarding

In OLADE, we feel as part of our mission, making specialists to discuss through forums.



the infrastructure, wind and solar parks have been inaugurated apart from the construction of geothermal, solar thermal and wind projects.

In the energy integration issue, cooperation revolves around technology areas, governance strengthening, energy safety and execution of memorandums of understanding for energy entrepreneurs. It is worth highlighting the energy integration strategies in terms of gas and electricity given in the different regions, as in the Central American Electrical Interconnection System (SIEPAC), which is creating an electrical regional market that integrates six countries, including the Bolivian vision, by which the country intends to become the energy hub in South America.

The electrical sector has focused on the safety of the supply through the application and strengthening of its infrastructure, using different strategies as tenders, the opening of the electrical market and debt contracting. In terms of electrical coverage, regions reach an average of over 90%. However, countries continue working to expand their energy services to population and on sustainable methods that contribute to the Sustainable Development Goals to 2030.

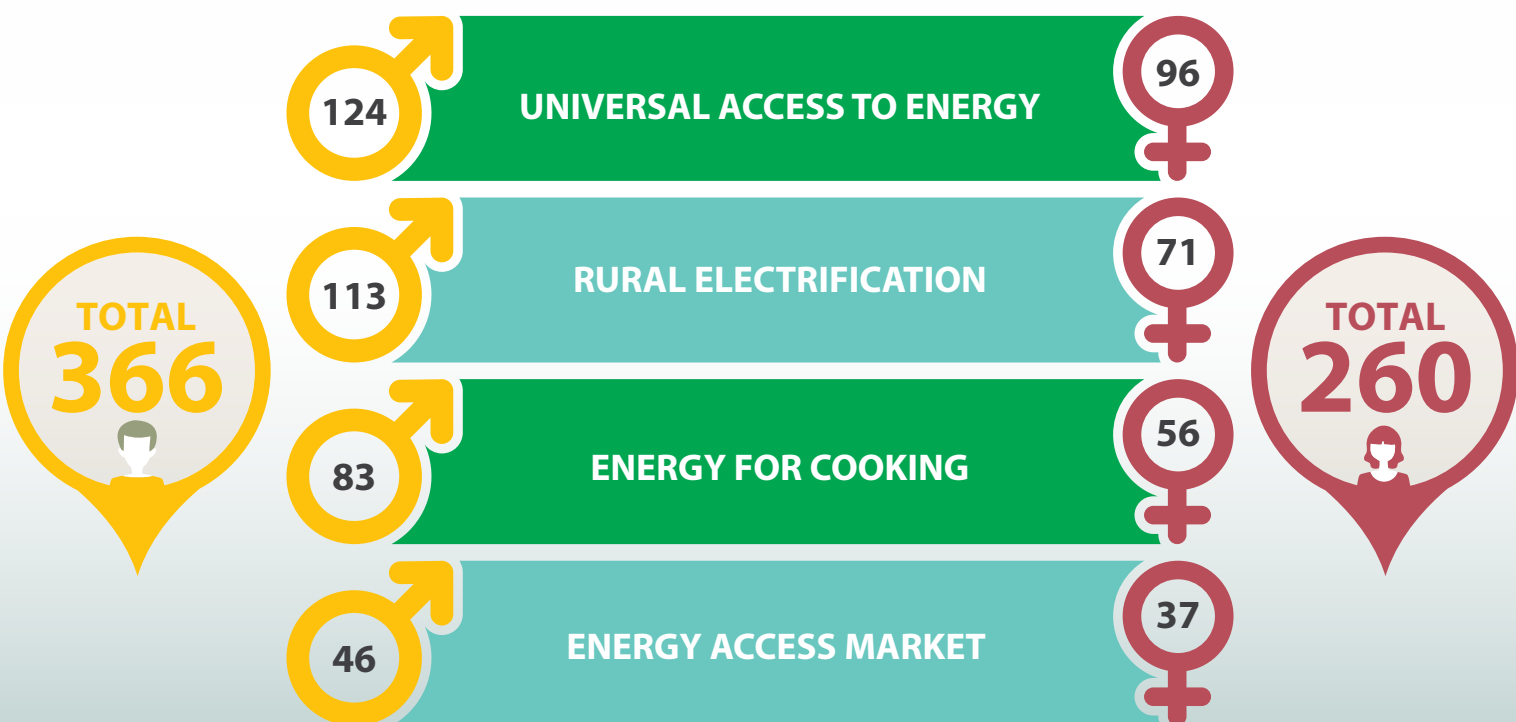
On the other hand, the reduction of energy prices as a result of the fall of oil prices has brought a benefit that has been most evident in regions depending on imports, such as the case of Central America. Moreover, this reduction has motivated the hydrocarbons sector to improve its competitiveness through the opening to private capital (as in Mexico), and in other cases to establish strategic associations and cost reduction to continue with the incorporation of conventional and unconventional resources. This year the investment for the development of infrastructure in natural gas in the region has been highlighted.

Finally, while COP21 is one of the most relevant events in 2015 we can recognize its influence in the publication of several reports on mitigation, adaptation actions, and increasing of resilience to climate change, as well as financing options for several projects that include energy efficiency. It is worth mentioning the genuine interest of the region to promote gender equity in the energy sector. For that, OLADE supports their member States through gender mainstreaming, training, research and generation of State indicators.

Countries continue working to expand their energy services to population .

## WEBINARS FOR UNIVERSAL ACCESS TO ENERGY

This year OLADE, with the support of the Canadian Cooperation and the Energising Development Project (EnDev), executed by the German Cooperation, implemented by GIZ, has carried out a series of webinars related to the results achieved on universal access to energy in Peru and other countries from the region. The quantity of participants- experts according to the subject matter is hereby detailed.





# Financing Mechanisms

Archive EnDev-GIZ

In the last years, the improved cookstoves market in Peru has shown a positive evolution due to the leading role that public and private actors have taken in the promotion of this technology. The EnDev-GIZ project, organization that has accompanied this process since 2009, comments on the development of this experience in the country.

By **Ana Moreno**, Director of the Energising Development Project EnDev-GIZ Peru



In Peru, the Energising Development Project (EnDev), executed by the German Cooperation, implemented by GIZ, has contributed to establish the improved cookstoves market through the development of financing mechanisms, which have facilitated the arrival of this technology to millions of households in the rural area.

Following with the objective of creating a market of access to energy technologies, EnDev chose to generate an initial action with improved cookstoves. Thus, between 2009 and 2011, the market development was focused on reducing the imperfection thereof, related mainly to limited information on the demand of said technologies.

In this context, the Peruvian Government decided to back the development of the market assuming regulatory functions as regulations, laws and the development of quality standards. Furthermore, it developed supporting functions related to informative campaigns on technology, and promoted temporary financial incentives aimed at addressing a particularly focused demand, as populations living in poverty and extreme poverty.

Said operation, known as “Half Million Improved Cookstoves for a Smoke-Free Peru Campaign”, allowed the construction of more than 300,000 improved cookstoves in different regions of the country. As well, it permitted the generation of a critical mass of families that acquire a new

technology for cooking, which subsequently were in charge of transmitting their benefits to other interested families, which were not part of the focalized demand asked where they could buy them. In addition, the demand created by public institutions that supported that campaign generated an attractive market for local supply, which should offer the inputs and spare parts of this technology, as well as their construction.

Precisely, from this initial effort promoted by the government, about 20 improved cookstoves manufacturing companies were created. Between 2013 and 2014, EnDev devoted its actions mainly to strengthen the supply of these technologies, thus, while a first great step has already been made thanks to public financing, in this second stage the adaptation of technologies and innovation strengthening was sought, so that the market may evolve and offer people a range of clean cooking solutions. At present, said companies continue serving the supply coming from social programs aimed at the poor and extreme poor, at the same time that the remaining supply (non-poor) is served through improved cookstoves retailing.

At the same time, during this period a new challenge for the improved cookstove market was identified, which was the absence of financing models aimed at both the supply and demand. Therefore, connecting the supply with those entities rendering financial services was sought, so that they can access credits effectively in order to improve their production.

Between 2009 and 2011, the market development was focused on reducing the imperfection thereof.

It is important that the supply strengthens its activities for promoting technologies.



ASPem - Filipoo Tadddei

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It is worth pointing out that by that time a critical mass of people wanting to acquire this type of products had already been developed, reason why the assessment of various micro-financial institutions was sought in order to develop credit products specially adapted for improved cookstoves.

For that reason, the main activity was identifying suppliers that fulfill with the quality standards and could provide a guarantee service for consumers that decided to ask for the credit. Also, the extension of the portfolio of pertinent technologies was suggested.

In this context, it is important to highlight that the consolidation of a financing mechanism through credit was considered as highly advantageous, thus, the growth of the improved cookstoves market and similar technologies would be strengthened in case there are no resources from the cooperation or other public sources.

**CONCLUSIONS**

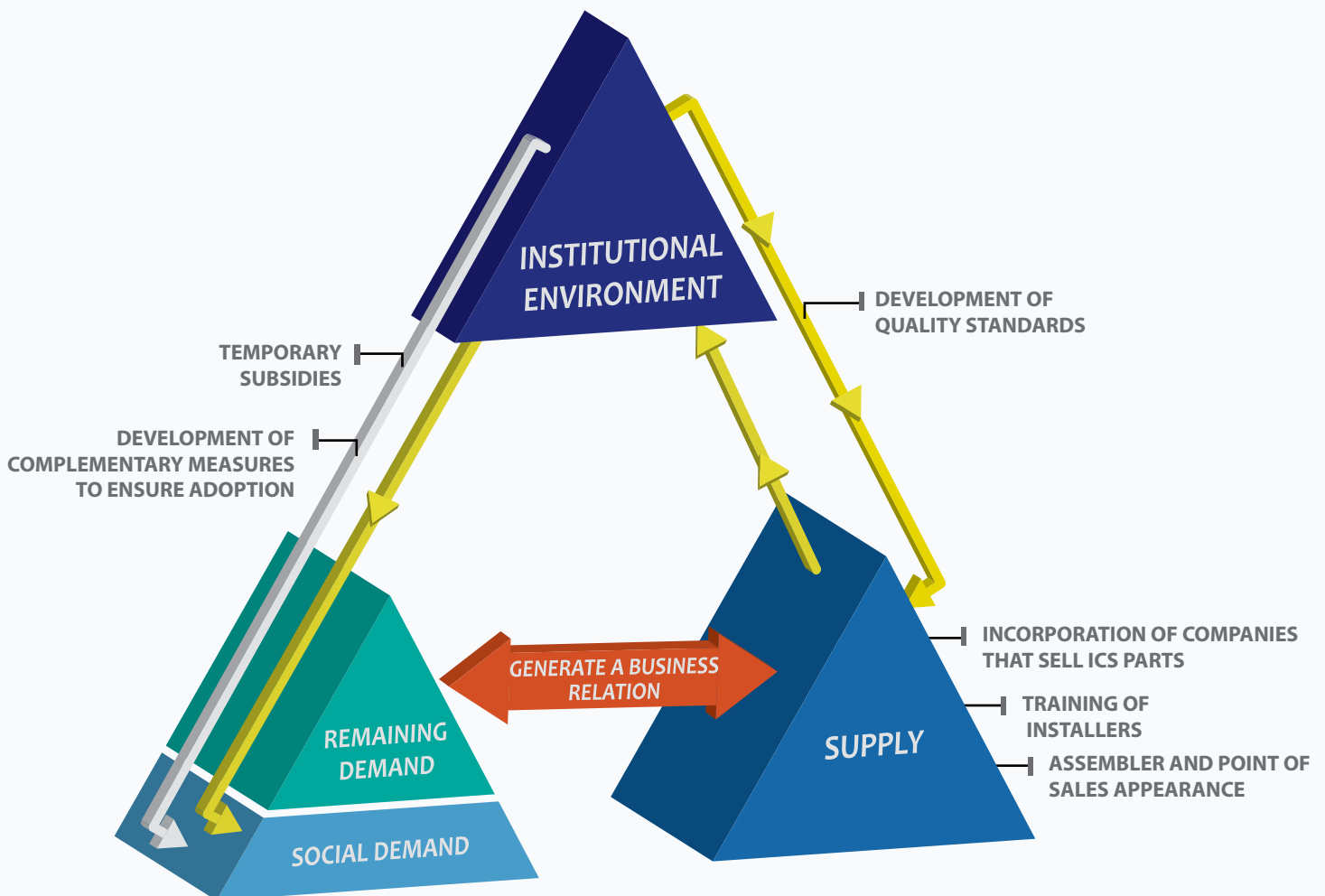
In EnDev we believe that each of the financing mechanisms presented contribute to the growth and boost of energy markets for rural areas. Furthermore, these may be developed in a parallel or consecutive way (one after another) as in the case of Peru.

The drive provided by these mechanisms is significant, especially, taking into consideration the flaws presented in the market of this type of technologies. In this sense, although NGOs and civil society organizations have traditionally been outside the market system, it is necessary that they assume an active role to strengthen business structures.

Finally, it is worth stating that despite the fact that public institutions should be outside this sector, their intervention through regulatory actions and/or temporary subsidies becomes necessary to generate the adequate framework, in which a prosperous relation between the supply and offer can be developed.

We believe that each of the financing mechanisms presented contribute to the growth and boost of markets.

**STRATEGY FOR DEVELOPING THE IMPROVED COOKSTOVES MARKET**







## EnDev Peru

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[www.endevperu.org.pe](http://www.endevperu.org.pe)

Driving the market is fundamental for consolidating access to technologies and making them sustainable.





# Improved Cookstoves in Latin America



Archive EnDev-GIZ



Omar Masera (in the middle) together with other speakers of the Latin American Network of Clean Cookstoves.

In the interest of articulating and coordinating effective actions, in 2014 the Latin American Network of Clean Cookstoves is activated, whose exchange of experiences is oriented to integral approaches that imply long-term sustainable use of improved cookstoves.

By Omar Masera, Director of the Bioenergy Laboratory of the Center of Ecosystems Research for the National Autonomous University of Mexico

Latin America is a region where the use of wood is highly extended. There are about 160 million domestic users, corresponding to different cultural and culinary traditions present in each country (see graph 1). Wood for cooking is mainly used in rural areas, where it can reach from 80 to 100 percent of population. In addition, the use of biomass presents advantages in terms of local availability and low cost. All of this indicates that the use of this resource will be maintained for long because there are not quick expectations for a complete change to other fuels yet.

In this context, the main problem is that wood is used in open fire for cooking in households, for smoke is concentrated in closed environments, harming the health of all the family. This is a fact that is reflected in 82,000 premature deaths per year, product of indoor air pollution (see graph 2).

On the other hand, excessive consumption of wood may cause environmental impacts since it degrades soil and increases deforestation, especially in some regions under vulnerable conditions.

#### REACHED CAPACITIES

Given this scenario, how to facilitate the transit of 160 million people in Latin America to clean cookstoves and generate a positive impact on their living conditions? To do this, it is necessary to change to a more efficient use of biomass as well as include other types of fuels, which may be gas, biofuels or other renewable energies.

Although there is a long way to go, we can say that Latin America has managed to develop important

capacities within this area. To date, there are national and regional programs and established technologies for large-scale manufacturing of clean cookstoves. Furthermore, ways for certifying cookstoves have been established, as well as an institutional framework for their regulation.

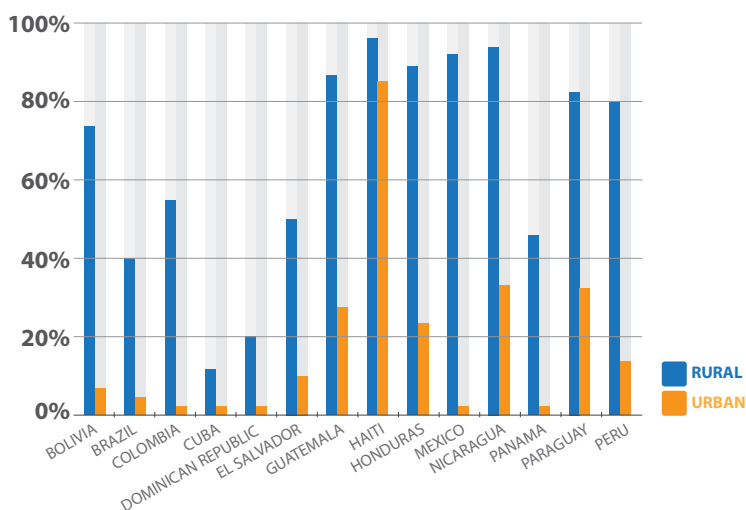
Focusing on wood, in the last ten years, two million clean cookstoves were installed, which are already considered as an important element in households. It is worth mentioning that the main models in the region are the multi-burners or plate cookstoves, whose cost ranges from 50 to 150 dollars; amount comparatively higher than the stoves offered in African and Asian countries that use smaller models. As well, there are established workshops that can manufacture from 100 to 10,000 cookstoves per month.

As for financing, there are projects that use “carbon credits”, which allows for measuring the savings of pollutants produced by clean cookstoves when delivering a more efficient combustion. Thus, there are several countries that already have this type of projects underway. Complementarily, there is an important regional work regarding the measurement of cookstoves performance and there are specialized laboratories for evaluating these technologies in Peru, Bolivia, Honduras and Mexico.

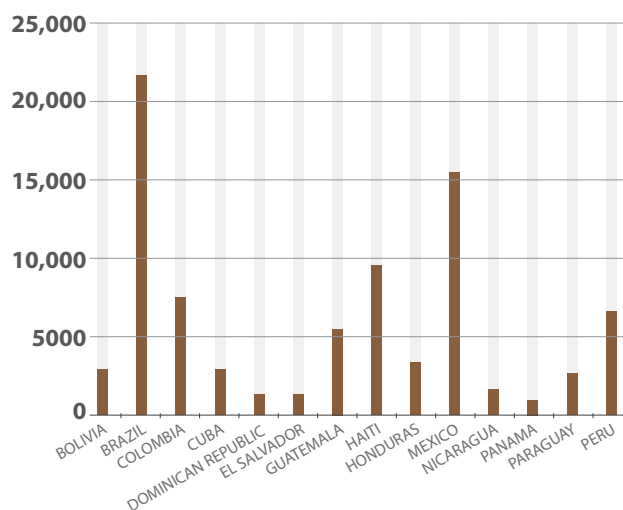
On the other hand, Latin America has some in-depth scientific studies regarding health impacts due to the use of wood and spatial models to determine critical areas to develop clean cookstoves projects, as well as participatory strategies for the design, innovation and dissemination of cookstoves. To sum up, while this experience and resources

Although there is a long way to go, we can say that Latin America has managed to develop important capacities within this area.

### POPULATION THAT USES WOOD FOR COOKING IN LATIN AMERICA



### DEATHS PER YEAR DUE TO WOOD SMOKE





allow carrying out fairly good interventions, the proper application of some strategic actions is still required in order to scale up efforts in short-term and ensure long-term lasting impacts.

### IMPORTANT ACTIONS

Apart from the possible financial and institutional difficulties that may arise in each country, which can definitely undermine the continuity of projects and weaken the priority they deserve, what is needed is to address other aspects that become a limitation for improved cookstoves interventions.

It is essential to understand that work is being done with a technology that is daily related to users and their immediate environment, besides having strong cultural implications. Sometimes, not having a clear situation has made some programs to fail because the best technology chosen from outside, several times does not represent the optimal or feasible solution for local users. It is therefore essential to develop mechanisms and strategies to ensure the adoption and sustainable use of cookstoves.

One of these strategies is known as “participatory innovation cycles”, where the needs of user groups are recognized and invited to get involved in problem solving. Women devoted to their homes can make a relative proposal for the cookstove design, which subsequently is perfected under laboratory standards. This process can be repeated several times until a technology that meets the expectation of users is developed.

Another point to consider is that many times stoves fulfill more tasks than just cooking. For example, they are used for heating or to heat water for bathing, reason why when a clean cookstoves is adopted, the stove is rarely abandoned. This is known as multiple use of cookstoves and fuels. In fact, it has been worldwide documented that mainly in rural and peri-urban areas, access to fuels and modern technologies for cooking do not automatically lead to the abandonment of traditional stoves (see graph 3).

Finally, one more consideration, which sometimes has been neglected, is seeking to dignify the cooking space and in general the whole house, as part of the clean cookstoves programs. Very dark rooms, which were filled with soot, shall experiment a joint change when access to an improved cookstove is done, so that women start feeling proud of their renewed cooking facility. These are really important elements for the success of programs and shall be considered, as demonstrated in Peru.

### REINFORCING THE STRATEGY

While Latin America has taken important steps towards better access to energy for cooking in rural areas, it is important to have integrated strategies. In that sense, it is essential to continue sensitizing governments on the use of wood, making them understand that only promoting access to modern fuels or LPG does not solve the problem as recognizing access to energy for cooking as a priority within integral programs of sustainable development. So establishing national goals for scaling up efforts is necessary as well as maintaining the local context in each intervention. Only then, successful adoption programs may be generated, in contrast to simple installation processes or generalized sales.

Similarly, instead of seeking to develop “a single cookstove that solves everything”, it is important to promote different models, fuels and practices, adapted to the different requirements of the region, as well as incentives for suppliers and users, in accordance with the conditions of every place. Driving innovation and regional standards development are transcendental so that governments do not prioritize the cheapest cookstoves, but those that generate real benefits for health and wood savings. In this sense, it is worth stating the need to have great flexibility of approaches, since we are faced with a variety of fuels, practices and socio-environmental contexts.



In 2014, the first meeting of the group was held in the city of Lima.

## LATIN AMERICAN NETWORK OF CLEAN COOKSTOVES

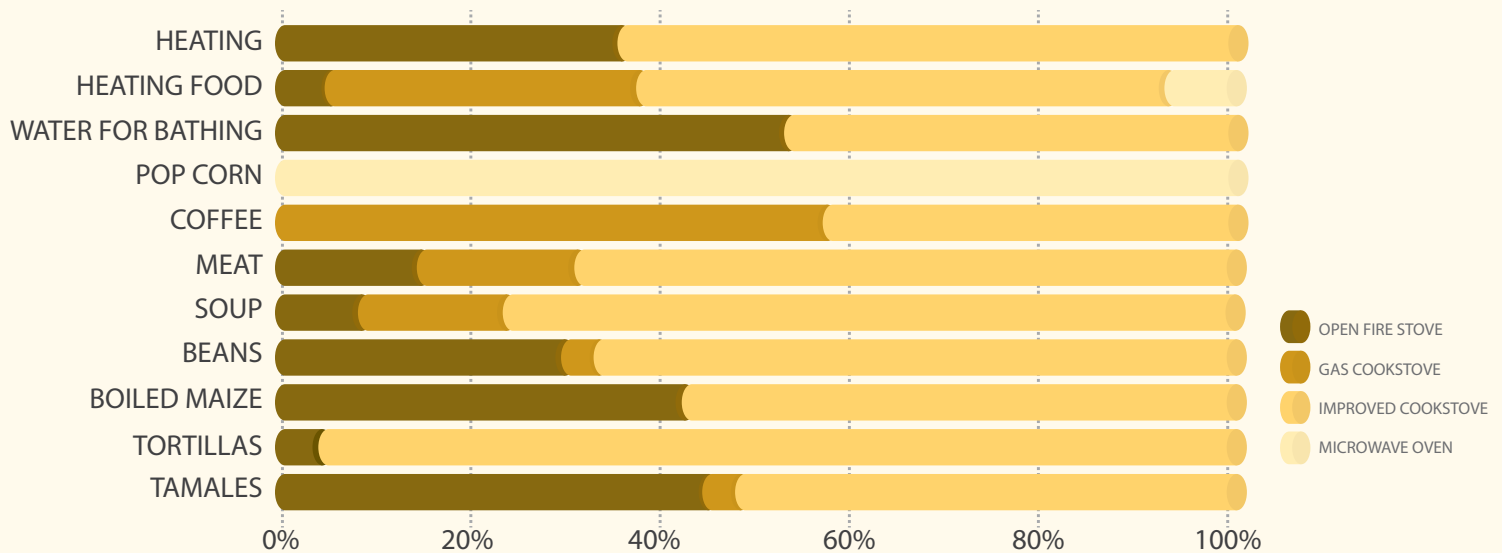
The Latin American Network of Clean Cookstoves (RLCL) is formalized in 2014, but has experience accumulated through years contributing at regional level. The first official meeting was held in Lima in 2014 too, and similar encounters were planned every two years. Also, news and progress are shared in a blog.

This network groups the efforts of public, private, academic organizations as well as international aid in Latin America and the Caribbean to face problems of access to clean energy for cooking. In addition, RLCL works together with the Global Alliance for Clean Cookstoves (GAAC), so that their work is aimed at reaching the Goals of the Millennium proposed by the United Nations.

[redcocinasoestufaslimpias.blogspot.pe](http://redcocinasoestufaslimpias.blogspot.pe)



## MULTIPLE USES OF COOKSTOVES AND FUELS



Source: Zamora et al. 2011



# America, the Continent without Darkness by 2025

The public and multilateral effort given to Latin America to expand its electrical service is really valuable, but the way to provide energy to the poorest and most remote areas is still uncertain. Fabio Rosa, Brazilian expert and member of PLESE, shows us how to overcome this gap in an articulated manner with civil society initiatives.

By **Fabio Rosa**, founding member of PLESE and President of RENOVE BRASIL

The most dramatic lack of access to energy services in Latin America is found in rural areas, where a specific problem, product of the difficulty of physical access, households dispersion, poor provision of other basic services and in occasions, total absence of the State is present; all of this, together within a situation of historical systemic poverty.

In order to promote effective proposals and solutions to favor access to sustainable energy services in Latin America, and responding to the goal of universal access to energy to 2030 proposed by the United Nations, in 2012 the Latin American Platform of Sustainable Energy and Equity (PLESE) was created. This platform represents an alliance between non-governmental organizations, with the intention to become a representative of the Latin American civil society before national governments and international organizations. Thus, PLESE's objective focuses on diffusing renewable and decentralized energies to reach the poorest and most remote areas in Latin America.

In this context, the idea is that the knowledge and experience of a member complement the other; by which generating this situation is very advantageous. Furthermore, the platform seeks to strengthen member institutions and their capacity to influence public policies in their corresponding countries.

#### THE BRAZILIAN CASE

In Brazil in 2002, the law on universalization of access to energy was approved, as result of a previous work that started almost two decades ago in 1983. This law defined year 2015 as the final milestone for all Brazilians to have access to clean electric energy. Furthermore, public and private concessionaires were determined as well as the model of cross-subsidies, so that users of the urban grid collaborate to finance the expansion of the electrical service. Like this, the country has made progress through a traditional model of grids extension, and in 2014 stated that 98% of the people of Brazil have adequate access to public electrification.

Despite this achievement, it has to be highlighted that civil society, non-governmental organizations, rural electrification cooperatives, among other similar actors, were excluded from this investment. Field information indicates that 60% of the Amazon's rural population still lacks access to electricity, this is to say, the poorest and most isolated.

In that sense, it is necessary to demonstrate that public and private companies in charge of the electrification process in Brazil have not developed any plans to reach these populations. This is

PLESE's objective focuses on diffusing renewable and decentralized energies to reach the poorest areas.

60% of the Amazon's rural population still lacks access to electricity.



because they are using traditional technological models with inadequate regulations, which causes that when faced with the difficulties of this challenge, they do not know how to reach isolated populations or what alternative systems to offer, since they are unfamiliar with new technologies that guarantee sustainable facilities.

Then, while the effort made by the government to expand the electrical service is really valuable, the way to provide access to energy to most isolated areas of the country is still uncertain. Therefore, in PLESE we believe that a complementary action is essential, considering that the work currently done by companies in charge is insufficient to address this part of the population.

### THE FORGOTTEN CONTINENT

An issue to take into consideration is the perspective that multilateral organizations have on the problem of universal access to energy in Latin America. If we observe international and the World Bank programs, aimed at access to water and energy services, it can be seen that great financing is dedicated to populations in Asia and Africa. In light of this, we can ask ourselves, if we are the forgotten continent.

Unlike African and Asian countries that have a very large marginal population that also lacks access to energy, Latin America has small populations in very large territories. In that sense, this is a comparative

distinction between continents that needs to be taken into account.

Similarly, different studies indicate that there are 31 million people in Latin America without access to electricity. However, there are still no government initiatives to guarantee that these people, the poorest, come to be considered within an effective access to energy, for example in the regions of the Peruvian, Colombian and Brazilian Amazon. In this context, there is no evidence of an integrated development of the State, but isolated actions that are executed mainly by the ministries of energy. Likewise, achieving this objective would mean a high risk investment for private companies, whereby there is no evidence of a solution from this sector.

On the other hand, it can be noticed that the initiatives of civil society (considered the “third pillar” in Sustainable Energy for All of the United Nations), are not part of public projects, and therefore their important technological knowledge and proposals are wasted. Like that, this scenario leads us to conclude that we are facing an inadequate implementation of public and multilateral investment, linked mainly to non-renewable energy technologies.

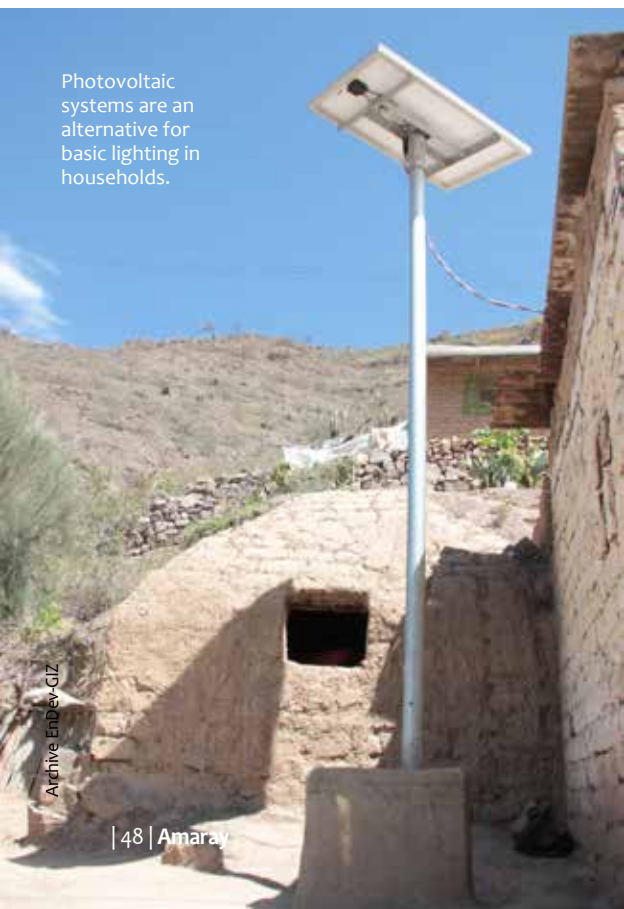
### CONCLUSIONS

The Brazilian experience allows us to observe lacks on the track to universal access to energy. While very valuable actions have been taken, we are still facing the need to provide universal service. In addition, ongoing public policies do not reflect current technological, social and business progress faced by the region, knowing that we have the means to generate sustainable energy progress and energy emancipation for the poorest. There are advanced pilot projects, but they are not included in the plans of the state.

In conclusion, it is necessary to go beyond than it has been done so far and we believe it is essential to find an articulated track with the initiatives of civil society. In this regard, PLESE members, that are developing projects in all member countries, have valuable knowledge to serve populations and territories where governments have not been able to intervene effectively yet.

Finally, it is necessary to understand that to achieve the ultimate goal of providing universal access to energy in Latin America, a joint effort in the medium and long term is required, considering medium and high risks, and managing public and multilateral funds efficiently (see chart 1). In this way, we could generate an impact that places America as the “continent without darkness” by 2025.

There are still no government initiatives to guarantee that these people, the poorest, come to be considered within an effective access to energy.



Photovoltaic systems are an alternative for basic lighting in households.



Latin America is characterized for having reduced populations in very large territories.

### POSSIBLE INTERVENTIONS IN RURAL ELECTRIFICATION

SERVICE CATEGORY	INITIAL INTERVENTION	IMPACT	TIME REQUIRED	RISK	FINANCING
RURAL ELECTRIFICATION PRE ELECTRIFICATION	SUPPORT AND ORIENTATION	HIGH IMPACT AT SOCIAL AND SUSTAINABILITY LEVEL	FROM MEDIUM TO LONG TERM	FROM MEDIUM TO HIGH	PUBLIC, MULTILATERAL
SYSTEMS FOR MITIGATION OF ELECTRIC EXCLUSION BASIC LIGHTING	SUPPORT AND ORIENTATION ARTICULATION WITH ORGANIZATIONS FOR ACCESS TO ENERGY KNOWLEDGE MANAGEMENT	HIGH IMPACT AT SOCIAL AND SUSTAINABILITY LEVEL	FROM MEDIUM TO SHORT TERM	FROM LOW TO MEDIUM	CIVIL SOCIETY, COMMUNITY, PUBLIC, MULTILATERAL

## PLESE

Despite the efforts carried out to provide electricity to rural populations in different countries in Latin America, there are still 31 million people without access to electricity or any source to access it.

Facing this challenge, in 2012 the Latin American Platform for Sustainable Energy and Equity - PLESE, coordinated by the National Network of Organizations for Renewable Energy - RENOVE BRAZIL was created. Thus, the initiative of civil society organizations from different countries has created this alliance that aims at organizing a continental project that will provide universal access to energy to the poorest and most isolated.

[www.renovate.org.br](http://www.renovate.org.br)



# Lighting with Third Generation Systems

In rural areas in Argentina and Bolivia several pilot projects using third generation solar technologies are being developed. Unlike the traditional systems, this equipment provides the same level of performance, better portability and can be easily installed by users, apart from being as well excellently accepted among them.

By Juan José Ochoa, Director of the Program of Rural Development for Alimentaris Foundation

Latin America is a continent with more than 30 million inhabitants without basic energy access services. Considering this, the Alimentaris Foundation, the World Bank and the Energética Foundation of Bolivia have been promoting a project to try new technologies to favor universal access to basic energy in a more economical, sustainable and faster way over time.

According to the census carried out in Argentina in 2010, the number of families without electricity amounts to 150,000, which corresponds to the “last” two percent of households. In addition, these households are in very poor contexts of severe

isolation, element that implies high logistical costs to render the electric service.

To counteract this reality, three pilot projects were developed in Argentina in the provinces of Jujuy, Santiago del Estero and Formosa, using in each location 24 third-generation Photovoltaic Systems from three different brands. Installations controlled by users, base line, mid-term and final surveys were conducted. At the same time, other laboratory studies, in charge of the Polytechnic University of Madrid, are foreseen as well as a validation from the National Institute of Industrial Technology (INTI) in Buenos Aires.

Settlers of Santiago del Estero, in Argentina, receive instructions on the use and installation of technologies.

From these three projects, the most favorable scenery in terms of population density is Santiago del Estero with only 1,5 inhabitants by km2. As well, the geography and the technical and economic characteristics of the three places differ from each other. Similarly, households also present great variety regarding used materials, which are generally precarious. In average, 78% of households have up to three rooms and an outdoor patio that should be also considered as a point to be lightened.

Concerning lighting products, according to the base line survey conducted in December 2014, the most common lighting solutions are battery-powered flashlights (85% of families), kerosene lamps (66%) and candles (38%), which demonstrate a situation very distant from modernity due to the use of expensive and low performance energy products, which can cause health damages and negative environmental impacts.

Regarding households' income, at present value the average family income amounts to 430 dollars per month, from which approximately 60% comes from the State, for example, from an allowance, retirement pension or universal allocation by child.

In terms of households' expenses, 60% corresponds to food and about 14% to energy. Thus, this figure represents an average energy expense of 29 dollars per month, of which half is aimed to lighting, while the remaining goes to radio and cellphone-charging, TV, gas for cooking, among others. It is important to point out that lighting and radio are present in the consumption of 97% of households,

whereas the use of cellphones was relatively low, reaching only 10% of households. However, this is an element that was modified at the end of the project, where 70% of households reported that they have begun using them.

**LIGHTING SOLUTIONS**

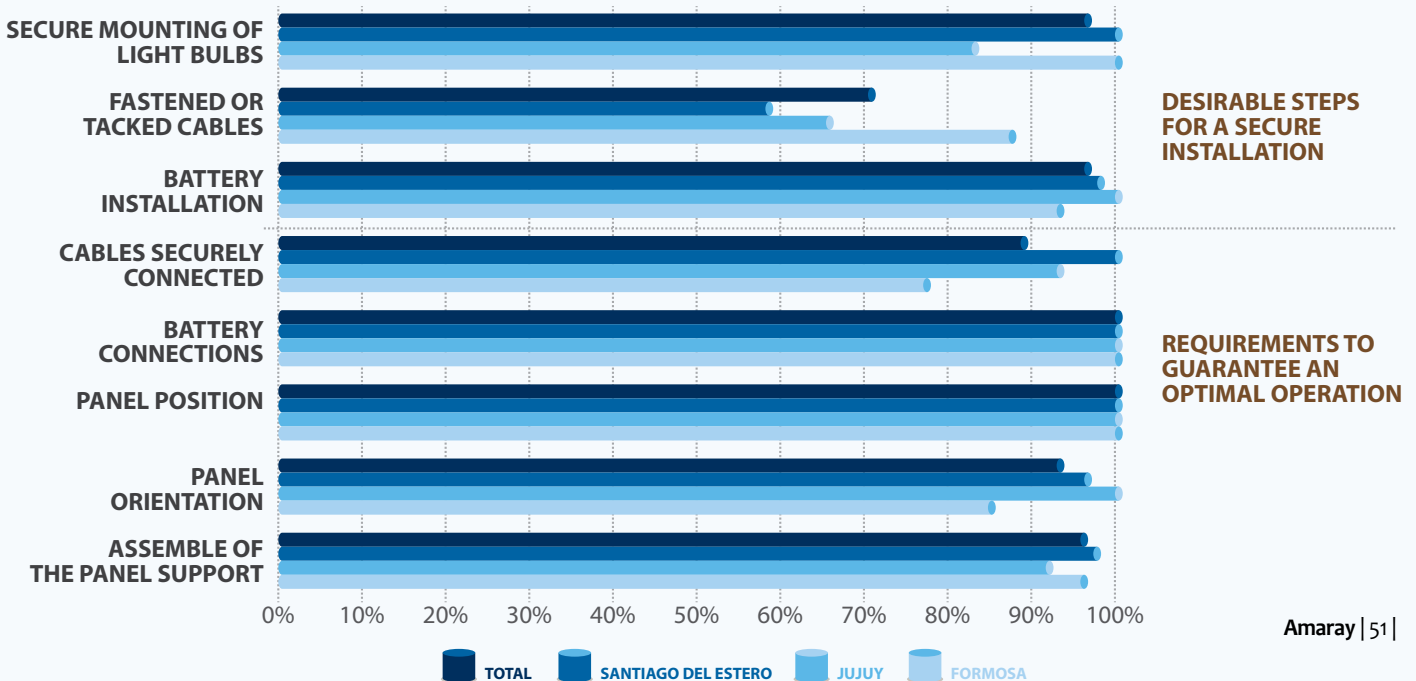
According to the pilot projects' approach, a workshop to show the equipment and give instructions on the installation, use and maintenance was carried out in each of the three places above mentioned. As well, each family received a poster summarizing the main guidelines. Then, after three days, we proceed to visit the beneficiaries' households to control de installation and observe probable difficulties.

Our intention was to assess to what extent these systems could be installed independently by users. The results indicated that 84% managed to fulfill with the installation, achieving an optimal system performance; 14% managed to install and put the system into operation, but missing aside some details, which did not allow an optimal performance (see graph). In this sense, 98% of people in charge of the installation stated that it was a simple process that took between 0.5 to 4 hours, and in 7% of the cases it was carried out by minors. In the case of elderly people, they asked their relatives or neighbors for help.

Similarly, these pilots allowed us to test the systems' great portability, which are made of three components placed in a box, that can even been transported in a motorbike. Therefore, this factor represents an important advantage over traditional solar systems, which components need to be transported separately,

The most favorable scenery in terms of population density is Santiago del Estero with only 1.5 inhabitants by km2.

**EVALUATION OF AUTOINSTALLATION PER LOCALITY**





and together weigh minimum six times more. As well, it is important to mention that these third generation systems are not reduced Pico PV-type systems, but instead they offer the same benefits that the ones traditionally used.

### RESULTS

The results were very positive: 98.5% of users are satisfied with the quality of lighting and 100% with their easy operation. Besides, 85% think that the equipment covers all their lighting needs, while the remaining 15% indicated their need of one or two extra points of light since the system provides two fixed points and one flashlight. Moreover, concerning the equipment autonomy, “days without light” were not registered for this equipment, which offers up to 20 watts and a battery of 7 amperes.

One of the main impacts was the complete elimination of kerosene lamps. Thus, getting ahead with some of the assessment results, it is important to mention one phrase stated by a user which demonstrates the acceptance of the equipment: “we threw the kerosene lamps away”. In this sense, from the point of view of users the greatest impact was having quality of lighting in households. Thus, declarations as: “having light”, “left darkness”, “threw kerosene lamps”, highlight reliability on “good light”. Similarly, the fact that the day is longer and it is possible to “live at night” doing different activities, “being in family” and kids “can study at nights without candles” is highly valued.

As well the importance of safety rendered by these systems against kerosene lamps, which cause burns and

fires, is also highlighted. Access to this type of lighting avoids contact with dangerous animals like snakes, present in these rural environments: “Now I know that when I get out of bed I’m not stepping on a snake”.

As stated before, for many families this solution is enough, but others will require systems with greater capacity. Therefore, we believe that for the development of bigger systems, it is important to maintain portability, self-installing and energy efficiency criteria.

### CONCLUSIONS

We can conclude that proposed technologies have proven good results in terms of self-installing, portability and users satisfaction. For that, these products are presented as a solution to ensure basic access to energy in a short term at national level, at a fraction of installation, operation and maintenance costs of traditional photovoltaic systems. We are convinced that the implementation challenge is mainly logistical rather than financial or technological.

Finally, beyond the great impact that these systems may have as a solution to meet the “urgency” of universal access to basic energy in Latin American countries, it is essential to continue developing large-scale adoption energy solutions that have great social and additional economic impacts on isolated communities. In other words, once the basic service is guaranteed, it is necessary to promote a second instance that allows broadening the spectrum towards “energy for the comprehensive development”, reaching productive uses, internet connection, water pumping, among others.

One of the main impacts was the complete elimination of kerosene lamps.

Equipment portability and easy installation are a clear advantage in comparison with bigger equipment.



## GUARANTEE PROCEDURE

Third generation systems can be dismantled by the user in order to be transported to a populated center, with a specialized restocking shop, which could be for example a warehouse.

Creating a guarantee procedure of this kind will complement the project, taking into consideration that this situation is immensely more economical than servicing traditional photovoltaic systems, where a trained technician is needed.



## Alimentaris Foundation

In Argentina and Bolivia there are about 150,000 and 500,000 households lacking access to basic energy, respectively, factor that impedes the development of these rural communities of very low resources. In view of this situation, the Alimentaris Foundation, in Alliance with the World Bank and the Technical Directorate of Energetica Foundation, have decided to evaluate in the field and in the laboratory new third generation solar technologies and outline new institutional models that allow universal access to energy in a faster, economical and sustainable way in the time.

[alimentaris.org](http://alimentaris.org)

Únete . . .

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# FASERT

FONDO DE ACCESO SOSTENIBLE  
A ENERGÍA RENOVABLE TÉRMICA

## CONVOCATORIA A CONCURSO 2016

El fondo de Acceso Sostenible Energías Renovables Térmicas (FASERT) busca dinamizar la cadena de valor del mercado de Tecnologías de Energía Renovable Térmica (TERT).

El principal componente de FASERT es un fondo concursable, a nivel nacional, de recursos no reembolsables para cofinanciar proyectos que promueven el acceso y la disseminación de las TERT entre poblaciones rurales y periurbanas.

Se invita a todas las entidades interesadas en desarrollar proyectos que dinamicen la cadena de valor de las Energías Renovables Térmicas participar de las siguientes convocatorias a lanzarse en el mes de junio del presente año:

- Concurso de Proyectos 2016
- Fondo de Crédito para Organizaciones de Productos
- Programa de Reposición y Mantenimiento de Cocinas Mejoradas

En nuestra página web [www.fasert.org](http://www.fasert.org), se puede encontrar información sobre los proyectos que desarrollamos, así como las bases de las convocatorias.

Se puede solicitar información sobre la convocatoria a [fasert@iica.int](mailto:fasert@iica.int)

### ¿QUÉ SON LAS ENERGÍAS RENOVABLES TÉRMICAS?

Son aquellas tecnologías orientadas a la producción de energía calorífica. Las fuentes primarias pueden ser, principalmente, la biomasa y la energía solar. Para el caso de la biomasa se pueden considerar como tecnologías de energía renovable térmica (TERT) a las cocinas mejoradas, los biodigestores y sistemas que mejoren la eficiencia energética y térmica de procesos domésticos y productivos. Dentro de la energía solar, son consideradas TERT las termas solares, cocinas solares, secadores solares, muro trombe, sistemas de calefacción/climatización pasiva, entre otras.

