

## Energy Access in Peru

—Transcript of a webinar offered by the Clean Energy Solutions Center on 18 November 2014—  
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**Panelists**

Richenda Van Leeuwen, Executive Director, Energy Access United Nations Foundation

Rafael Escobar Portal, Energy Program Manager, Practical Action Peru

Carmen Becerril Martinez, Member of Board of Directors – ACCIONA, President, ACCIONA Microenergia Peru

Christopher Jensen, Regional Operational Manager, Light up the World

**This Transcript**

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**Sean**

Hello everyone. I'm Sean Esterly with the National Renewable Energy Laboratory and welcome to today's webinar, which is hosted by the Clean Energy Solutions Center in partnership with the United Nations Foundation's Energy Access Practitioner Network. Today's webinar is focused on the work underway in Peru to support energy access using off-grid renewable energy.

This webinar is part of the broader work the UN Foundation is undertaking around energy access within the UN and the World Bank Sustainable Energy for All initiative. One important note of mention before we begin our presentations is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of many best practices resources reviewed and selected by technical experts.

I just want to go over some of the webinar features. You do have two options for audio. You may either listen through your computer or over your telephone. If you do choose to listen through your computer, please

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If you are having difficulty viewing the materials through the webinar portal, we will be posting PDF copies of the presentations to [cleanenergysolutions.org/training](http://cleanenergysolutions.org/training).

**Heather**

Sean, are you still with us?

**Sean**

Yes, sorry. I got dropped temporarily there.

**Heather**

Okay, thank you.

**Sean**

Yep

So again, you can find PDF copies at [cleanenergysolutions.org/training](http://cleanenergysolutions.org/training) and follow along as the speakers present. Also we are posting audio recordings of the presentations to the Solution Center’s training page within about a week of today’s broadcast. We are now also adding the recordings to the Solution Center YouTube channel where you will find other informative webinars as well as video interviews with thought leaders on clean energy policy topics.

Today’s webinar agenda is centered around the presentations from our guest panelists Richenda Van Leeuwen, Rafael Escobar, Carmen Becerril, and Christopher Jensen. These panelists have been kind enough to join us to explore the residual energy access issues in Peru and the run-up to the UN SBCC Conference of the party that will be held in Peru later this year. The webinar will showcase efforts underway to increase energy access in Peru with the four presenters.

This slide provides a bit of background in terms of how the Solution Center came to be formed. The Solution Center is one of 13 initiatives of the Clean Energy Ministerial that was launched in April of 2011 is primarily led by Australia, the United States and other CEM partners. Some outcomes of this unique initiative include support of developing countries and emerging economies through enhancement of resources on

policy relating to energy access, no cost expert policy assistance, and peer to peer learning and training tools such as the webinar you are attending today.

There are four primary goals for the Solutions Center. First of all, to serve as a clearing house of clean energy policy resources, second is to share policy best practices data and analysis tools specific to clean energy policies and programs, and third is to deliver dynamic services that enable expert assistance, learning, and peer to peer sharing of experiences and then lastly, the Center also fosters dialogue on emerging policy issues and innovation around the globe. Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries. We also strive to engage with the private sector, NGOs and civil society.

One of the marquee features that the Solution Center provides is the no cost policy assistance know as Ask-an-Expert. The Ask-an-Expert program has established a broad team of over 30 experts from around the globe who are each available to provide remote policy advice and analysis to all countries at no cost. So, for example, in the area of energy access we are very pleased to have Ellen Morris who is the President and Founder of Sustainable Energy Solutions serving as one of our experts. If you have the need for policy assistance in energy access or any other clean energy sector, we do encourage you to use this valuable service. Again, it is provided to you free of charge. To find out if the Ask-a-Benefit service can benefit your work, please contact me directly at [sean.esterly@nrel.gov](mailto:sean.esterly@nrel.gov) or at my office number, which is 301.384.7436. We also invite you to spread the word about this service in your networks and organizations.

Now I'd like to provide brief introductions for today's distinguished panelists. Our first speaker that we'll be hearing from is Richenda Van Leeuwen the Executive Director of the Energy Access Initiative at the UN Energy Foundation. Then following Richenda we'll hear from Rafael Escobar. Rafael is an Energy Program Manager with Practical Action Peru. Next up is Carmen Becerril Martinez. Carmen is a member of the board of directors at ACCIONA and President of ACCIONA Microenergia Peru. Then our final speaker today is Christopher Jensen. Chris is a Regional Operational Manager at Light up the World. Now with those introductions I would like to welcome Richenda to the webinar.

## **Richenda**

Thank you very much Sean and good morning everybody. Just for those of you who are joining us for the first time, you may or may not have heard that we will be repeating this webinar tomorrow in Spanish for those who are able to follow in Spanish with one additional presenter who, unfortunately, was unable to join us today.

My name is Richenda Van Leeuwen. And I lead the work on energy access for the United Nations Foundation and we are having a few technical difficulties unfortunately at our end because I cannot see the

slides so if you could at least forward to the first slide that focuses on Sustainable Energy for All. Our work on energy access is part of the UN Sustainable Energy for All initiative. We are focusing on helping to capitalize action towards bringing and delivering energy solutions to the over 1.2 billion people around the world who still do not have the benefits of electricity and focusing specifically around facilitation of electrification with developmental benefits in mind.

The three objectives of the Sustainable Energy for All initiative are first to achieve universal access to modern energy services, which includes electricity as well as improved cooking solutions and heating by mechanical energy by 2030. The second and third are doubling the global rate of improvement in energy efficiency and doubling the share of renewable energy in the global energy mix by 2030 as well. We are currently in the second year of the...the first year, sorry, of the designated decade of Sustainable Energy for All, which the United Nations has declared as well to try and bring more attention to the issues. Next slide please.

More than 80 countries have joined in the initiative and the Sustainable Energy for All initiative is a public-private partnership that also includes very much private sector and NGO action as well in support of universal energy access.

Here at the UN Foundation...next slide please...we are primarily focusing on off-grid distributed energy solutions, which the International Energy Agency, among others, have recognized and will represent around 60% of the residual solutions for people who don't have access to electricity because of challenges with grid extension around cost, technical issues, and others. We are focusing very much on catalyzing and supporting primarily market led activities to help create a sustainable and robust market for decentralized energy solutions, whether it is solar, wind, biomass, micro hydro but we are agnostic about the actual type of solutions that seeing that it's very much a contextualized within the country and local conditions. Since we launched our injury access practitioner network, which is focusing on these efforts, back in 2011 we've grown to now 1800 enterprises and organizations in the network. Last year delivered, collectively, energy solutions to more than 21 million people in different parts of the world. What we're doing is really capitalizing action and advocacy around supporting energy service delivery at the country level, promoting new technologies, financial and business models—particularly to help address the challenges that we face. I'm sure we will hear about some of those this morning here in Peru where we are looking at markets or areas that in fact perhaps have very dispersed populations. You cannot take a regular commercial approach to bringing electricity into those areas because there's no margins as a business, there are many technical issues, you have issues around affordability, and also how to actually insure that the solutions are sustainable over a longer term as well.

We are focusing very much on looking at and supporting best practices, whether it's existing or emerging, and also providing a range of knowledge development activities including these webinar series as well.

I will just end with saying that if you are not yet part of the Energy Access Practitioner Network, we do very much welcome your involvement and you can join us if you go to our website at [energyaccess.org](http://energyaccess.org). The last slide shows that the residual issues in Peru are of particular interest to us because other than Haiti in the Latin America and the Caribbean region in fact Peru is still the country that has the largest residual number of people that do not yet have access to electricity. In Latin America as a whole estimates vary but it's somewhere between 30 and 50 million people so we very much hope that by expanding government activity, government efforts, as well as private sector and NGO efforts to bring energy services to those people in fact that the Latin American region can showcase that it can achieve universal electrification, we hope, ahead of 2030. We have a strong presence in the region, almost 300 member organizations across Latin America and about 65 have operations in Peru. We will be hosting at the COP21...COP20 in Lima. Next month we will be hosting an energy access side event, an official side event, in Lima and we very much hope that those of you who are planning to go to the COP will be able to join us there as well. My final point is that one of the presentations being made tomorrow will probably touch on the fact that the government of Peru just in the last week has announced plans to award a very large contract to a Peruvian company, Ergon Peru S.A.C., to bring solar PV to the residual population that does not yet have electricity access. So it will be very interesting to hear from the other presenters how they view the awarding of that contract and their own perspectives in terms of if it's likely to succeed and what's going to be required to insure that in fact that program is successful. So thank you very much Sean and I'll turn it over to the other panelists now.

**Sean**

Thank you Richenda and we're going now to Rafael Escobar so just make sure you unmute your mic.

**Rafael**

Good morning. These presentations that we have made in Practical Solutions it's our to achieve the energy in rural areas. Three key elements for these presentations are—we present an attainable mechanism to have access to energy reaching both aspects to have more social participants. A very important factor is the financing to these projects that we try to execute here in Peru. So the main energy planning is with renewable energy. We look back to the particularities of the access in Latin America. We can see that there are still millions of people using firewood in order to have energy in their homes but also we can add that there are important things going on to have more energy for these homes in Latin America and especially in Peru.

It is our concern that's why Practical Solution is working on this renewable energy, because we have a very good knowledge of what's

going on in the rural areas of Peru. Because even though the country is growing very fast, today we have 1.2 million that can access with RES, this amount of population is located in very far away areas but have a very high level of poverty but low consumer rates. But, they have a very big hope to receive this energy very soon. They are located especially in the jungle and in the Andes in areas very far away from different cities. So, having an overview that we see that there is a great amount of people without energy. So Practical Action is making a question—why planning in rural areas and why with renewable energy? Moreover, why with a small scale renewable energy? So we believe this is possible and that's why this participation energy program, but to apply this methodology that took a lot of time to plan and make it. We need to identify the key areas where there is intensified lack of energy in the country so we identified that there is a lot of capacity of local governments to promote energy development. These governments are not able to foster this energy project and we also identified there is a lack of support for technical issues and maintenance. An important factor is the gap that we find between the different sectors involved—involved in the energy sector and in the local governments, which makes the decisions are quite as low or not adequate decisions. On the other hand there is a lot of knowledge of what are the real needs of these rural areas in energy issues. In this last point I will need to add in the daily work we found that in many municipalities and local governments they use information, not updated information that is used by the energy sectors or different sectors involved.

In the other hand, there is a particularity of the different policies. We can verify this when we have an approach with the local government and we speak to the major or the different authorities and we ask what are the solutions to improve energy access in your areas and the answers are different from what the central government is planning for them. For example, in the north of Peru there is a great possibility to make big hydro electrical that may foster the productive use taking into account that this is an agricultural area of cacao and poppy, but Mayorga says that they are receiving from the central government technologies that are not allowing them to improve with these policies. So there is a priority cover and need but they are not looking to the production use of the same. So our position from Practical Action is not only to cover a need but also reduce poverty. That is our intention and that means to include the rural economy. As it comes with, we have a working experience and that is what we are going to express.

There are key criteria for example that define this participatory energy planning. Our first criteria is a policy with a territorial approach. This has to be with an integral vision of the natural resources of the area. Also, another key factor has to be with the legal mechanisms. Here is where we need the different energies—hydraulic energy or aulic energy in a long scale. Peru is moving ahead, having subsidies for the solar energy but in the small hydraulic and aulic energy these subsidiaries are not defined

already. On the other hand the management of natural resources mainly is a local government's work. We are very interested to make them more efficiently. Finally, these participatory energy plans have a lot to do with the dynamics of production chains.

So this is a summary of these participatory energy planning. Practical Action has a center of training, a training center, that is called CEDECAP. This center has been working with different emissions expertise and political people trying to work with them in the different designs and planning of these renewable energy projects. This center has been developing different activities and has developed different events. For example, one that has been with Ecuador and they developed a workshop for [inaudible 29:52] in America. So as a consequence this center relocated in the north of Peru has been a key factor for this energy planning due to...because here in this center we train a lot of leaders and a lot of energy promotions now are operating and managing the systems that we have implemented with this experience.

Now let's take a look what we have done with this methodology. You can see the figure, the graphic, on your screen. These are the different particularities that happen in the region of Peru that is called Cajamarca. You notice that in some provinces where we have been working has the lowest level in electricity and energy. So as a consequence, that defined many energy factors in the area.

In the next graphic you can see very easily the energetic overview in the area and you can see that the amount of people without energy is very high. The columns in blue show you the people that are not having energy. I mentioned at the beginning of my presentation in the picture you can see how are those localities, those small villages, very apart from the cities. So I believe that the big challenge of the rural energy is to unite with the rest of the world.

So this plan, once it's identified the energy products and the resources that population has, will start to identify who are the key people in this project. You can see that there is a group of key actors involved that were involved according to their role in these energetic plans. Half of them have the expertise in technical issues, others in local equipment—at the municipalities and different authorities, the ones that are very trained in the energetic issues, the municipalities that has taken different commitments, the development of different capacities given by CEDECAP, and a co-financing made by different authorities to drive the process.

With this team we start working in the field that leaders put a lot of effort trying to identify natural resources—water, wind, and biomass and especially to know very well what is the profile of that demand—the demand of the population for energy. It has been a very rich and fruitful work of the different actors involved. We have a lot of discussion and we

have also very attention models, especially when we need the financing for the different projects.

After this stage you can see that we identified this number of projects and a range of power for each system. Here you can appreciate the number of projects for each technology and the investment that we have for each of these projects. This investment is the result of profile of projects that we have at the end. This profile of projects that are happening designed in mechanical issues became as a bank of projects with different municipalities involved so as a consequence they were part of the financing plan of the different municipalities. This process to include these financing plans with different municipalities wasn't so easy as I am mentioning right now. As you know, always in the municipalities and in a process like this we have political issues and the different interests involved but we achieve that the municipalities with all their people involved made the right decisions to execute some of these projects. This experience started in the year 2007 and today, after many years, you can appreciate in the chart the different systems that we made and investment made by the different local municipalities, also the investment made by the international corporation.

An additional result to the numbers that I mention in here we achieve a constituent to form 11 small business that now are managing one of these systems in each of the communities where we have presence. The important thing is that these people are now having an income after managing their own systems, energy systems. They have a local rate but they have not achieved to have a local concession, a rural concession, so they can receive these subsidiaries so we are looking forward to achieve this subsidiary and we are speaking with the different institutions in Lima in order to achieve these subsidiaries and to have better sustainability in that areas. A question arises from this presentation. Is it possible to apply this methodology in different context? We believe that yes, it is possible because there is still a lot of places, San Pablo for example, without energy and with this kind of proposal we can improve the access to energy. That's my presentation and thank you very much for your attention.

**Sean** Thank you very much and now we will turn it to Carmen for her presentation.

**Carmen** Yes?

**Sean** Yes, we can hear you Carmen. Go ahead.



## Carmen

Okay, thank you. Thank you very much. My name is Carmen Becerril. I have been the president of ACCIONA Microenergia Peru and ACCIONA Microenergia Mexico as well. First of all just to say that we really appreciate the opportunity that the United Nations Foundation has given to join this webinar and explain our experience in rural electrification in isolated areas and particularly the program that we have developed in Peru, in the north of Peru, in the same region as our colleague of Soluciones Practicas in the region of Cajamarca. First of all we should just explain who we are and how we have defined this project.

Please next slide.

ACCIONA Microenergia is just a condition created by ACCIONA listed company, a Spanish listed company. We as a company we are working particularly in three different fields: in the development of infrastructure, in the development of construction, development of infrastructure for water, and then the development of renewables. We are working in more than 30 countries and our experience is just, of course, is just to develop enterprises. This idea we started working in the condition trying to focus our activity on the specific lines of business inside the company. So, this is why the initial idea was to provide energy, electricity, with renewable technologies and also to try to develop some water product. At that time we are working only on electricity, hopefully in suburbia. In a couple years we will start also with water in the same areas where now we provide renewable energy. From the very beginning the idea was just to try to demonstrate that there is an economical possibility on the development of this kind of project because at the end of the day this isn't only a corporation. This has to be something economically feasible to insure the project can become big and bigger and can provide rurally, can cover the needs that we can identify in a lot of countries at that time. This is why even when originally we are from a foundation then the two organizations that we have created—the one in Peru and the other one in Mexico, are really something like social micro companies. We are not working as foundations in the two countries where we are developing our projects today. The purpose of our activity is just in the isolated rural communities, normally poor or very poor people. The experience I have to say has been impassioning indeed and of course one key issue is that to collaborate with other actors, of course to collaborate in the project that we are developing but also to collaborate just to share experiences and to try to learn from the rest of the people working in the field that we are doing today.

Next slide please.

Focusing our attention in the program Luz en Casa, which is the one we have been developing in the north of Peru, let me introduce to you some global considerations.

Please next slide.

First of all the solution that we have used to develop this program are solar home systems. Later on we will see with this technological solution there is no particular innovation in the technological solutions. The question is to develop a project ensuring it can be economically sustainable and affordable to be working in these areas with these very poor people. At that time we started in 2009. Today we have more or less 4,000 households; 4,000 families around 16,000 people attended by our service with this portable type system. Probably one important, two important aspects—first we reached the breakeven point last year. That means that today the organization works by itself. I mean there is no need to send money from the foundation in Spain to ensure that the organization can go on with their own activity, which is quite a key aspect. It is probably important to explain how we have reached this point. We will do it a bit later.

Another aspect, which doesn't appear in the slide but also very important, is the idea that we provide the service so we keep the ownership of the system and we give operation and maintenance to all the people, all the 4,000 families who are our clients. Of course we need to define economics, right economics, to ensure that this breakeven point reached. One of the economics, one essential aspect is that each one of our families has to pay S/.10, around \$3.5 every month to pay the service. It is an amount of money 30% less than the money, sorry, 50% less than the money they spent before just to use candles, kerosene, or any other solution that they could have. Probably to remark that the default payment is lower than 1% so people are really committed with the use of this portable type systems and really committed to do it properly. Probably at that time we were a private initiative and there are not too many companies that are developing this type of product and I have to say we are really proud of our work in this period.

Next slide please.

Now you will see the areas where we are working. Couple of names probably, couple of names you can realize that are the same areas where Soluciones Practicas is working in Cajamarca—San Pablo and Tumbaden just in the left corner. You can see that we are working also there. The point is that we are working in more than 100 little villages in an area with very difficult, with a lot of difficulties with transportation and communication. So the challenge is to ensure that we can provide these operation and maintenance even when the areas are really separate and it is difficult to arrive to all these homes but little by little we are trying to define an area bigger and bigger and just working with the support of different technicians that we have trained the last couple of years and who works with us to ensure that this operation and maintenance can be provided without any problem.

Next slide please.

In the next slide you can see the essential aspects of our business model. First of all, as I mentioned, the technological model is not a very special one. I mean there is not a lot of innovation on it but it tries to be affordable enough. It tries to keep reliable enough. You can see here the PV panel, the controller, the switches of course. Normally the standard system that we are installing includes 3 lamps. At that time we are using of course LED technology and then one socket. This is the technical model.

From the management point of view I think there are key aspects for the development of the project. Of course there is a lot of interest cross in the development of this kind of project. First of all, you can see the reference to the authority, to the regulating authority, OSINERGMIN. They have approved a specific type for Luz en Casa. This is why my colleague from Soluciones Practicas mentioned that solar has their own tariff to attend this kind of service because it is true that part of the money to make possible the project comes from directly from the families, from our clients, but another part of the compensation comes from the regulation in something like a social tariff, which compensate the cost of the investment.

Another important part of this project is this local maintenance technician. I mentioned before that we have people in all this area in the different districts, people trained by us, people who have been working with us during the installation process. Then they assume also the maintenance when we ask them to go to some place to attend any kind of incidence that we receive with information that we receive. At the same time local councils are always key. Of course we will explain later on our global methodology and part of that of course, very important, is to keep a fluent relationship with the local counsels but at the same time of course what we have to take into account is the relationship with the community. This is why we organized something called Photovoltaic Electrification Committee in every community where there are three different people. We will mention what is the role of this committee. It is really important to ensure the properly development of the business in general. It is through this committee that we keep the relationship with the users. In fact, the committee, one person in the committee is in charge of receiving the money every month. You can also see in this slide the economic model. Globally consider the cost of this project during this last six years. It has been 3.1 million euros directly financed by ACCIONA. It has been the foundation, the ACCIONA foundation. It has been 1.7 million euros. Then we have received a credit from the...sorry, I have it in Spanish. The Inter-American Bank, they have given us a credit but also of course we are considering funds directly from the AMP. We are considering as well all the money coming from the users and from the operation and then for me the IDB has also collaborated with us in the development of the last part of the project. This is the three key elements to have an idea of how we have developed this Luz en Casa in the north of Peru.

Next slide please.

Let's take a look at the methodology. In this slide and the next one we try to explain how we have faced the challenge to arrive at Cajamarca and to start the conversations with the communities and to define the main, the essential scheme for the business. I have to say that initially we started thinking on it in Madrid, which is far away from the north of Peru. Of course all the original ideas that we had it has been necessary to redefine it to ensure that it works in Peru and in this particular region. So we started with this and sensitization assemblies just trying to explain to any community the idea to provide energy installing PV panels one-by-one in every house, not in a connected system. I have to say that originally some people were a bit skeptical probably because there are a lot of people just visiting these communities and visiting those areas in general. They might see a lot of things but not always we can see so this is why initially they looked at us a bit waiting before explained the commitment and accept the commitment to join the project. Secondly the municipalities agreement, as I commented, it is absolutely essential to have a fluent relationship with the municipalities. They have to accept that the willingness is just to help them to develop and provide energy in the most isolated areas of the municipality and they have to support us to ensure that the project can be developed likely. So we started 6 years ago with demo installations in 10 different communities trying to explain to people that we were really committed to the project and with the idea. All the families decided to join the program for sure and we would have the opportunity to provide them this PV panel and this technical solution to ensure the lamps and the plats in this case.

Next slide please.

Following with the story that the next step was the creation of these Photovoltaic Electrification Committees. We asked every community to create this committee with these three people—the president who is the person in charge of the project in the community, the treasury who is the person that takes the money from all the neighbors and sends it to us, and another person to help with the tasks. One of the conditions is that one of the members of this committee has to be a woman. This is a way to enhance the role of women in these areas.

As soon as we created the committee of electrification this committee organized the list of families who wanted to join the program identifying the place, identifying the house, identifying the family so installation started. Originally we were just foreigners arriving to their homes so we decided to contract the installation to an enterprise, a Peruvian enterprise. The second place of the project we decided to train our own technicians and to do the installation by ourself. Then the last part is operation. Operation and maintenance is the key part of this project. It is the key aspect of this project because PV panels have been disseminated a lot of times in a remote area. The point is that we have decided to stay in the zone. We have decided to ensure that if we are staying that the PV panel can be working for 20 years, with up to 20 years there, ensuring that our

clients had the right service of energy. This is why we have the particular firm to ensure that we have the right economics to change the batteries in 5-6 years. Probably this year and next year we will start changing some batteries of the first 1,000 clients that we have had. So the key aspect as I mentioned is to ensure that we will be there. We will be beside our clients.

Next slide please.

I have already commented that the Multilateral Investment Fund member of the IDB group has helped us with the last part of the project. They have also made a study trying to evaluate the impact of the project in the area. Here you can see some of the considerations of this small study.

**Sean**

Hi Carmen, sorry to interrupt but we are starting a little bit low on time and we still have Chris to present. Could you try to wrap up in the next 2-3 minutes?

**Carmen**

Yes, of course, because this part is more or less the same as I have already explained just underlying that there are savings for the people in this solution compared with the solutions that they had before.

If we can pass the next slide.

Here you have the explanation of how it works in the different areas and the different families. The next one explains how it impacts children. At the end of the day the conclusion is, of course, that PV solution is a great solution to increase the quality of life of all these people in the area. I have been there nearly every year I go to visit these communities and I have to say that the best thing that we have is the clear commitment and the clear engagement of all our clients with the project. I think I am open to future questions. Maybe just only one remark—initially you asked us to make some consideration about the last tender organized by the Peruvian government. Probably the most remarkable aspect from our point of view is that it is amazing the economics of this effort. They are talking about something like less than \$200 dollars per year, their system. After our experience we can say it is very difficult to ensure the sustainability, the economic sustainability, of a project of this characteristic with these economics. Thank you.

**Sean**

Great, thank you Carmen and now we will turn to Christopher Jensen for his presentation.

**Christopher**

Thank you. Can you hear me?

**Sean**

Yes, if you could just speak up a little. It is a little quiet on your end.

## Christopher

Okay, perfect. Hopefully this is a little louder for you guys. I'm having a little bit of technical difficulties but I will try to see how we can work that out over here. I'd like to start by saying thanks to the United Nations Foundation and also the Energy Access Practitioner Network for allowing myself and Light Up The World to present here on the panel along with the other colleagues who presented earlier on in the webinar. I am going to go ahead and we are pressed for time. I think the panelists did an amazing job to provide a good contextual overview of some of the limitations in some of the areas and statistics around Peru. I am going to go ahead and talk a little about who we are as an organization, what we've been doing, some of the challenges, lessons learned and also looking a little bit forward at how we see ourselves in Peru and other areas in Latin America. So, Light Up The World is an organization that's a Canadian organization. It is a non-profit organization focused on sustained off-grid communities. These are communities that are very rural or remote and are limited in a lot of ways of receiving assistance to electrical connections. It was originally started by a gentleman by the name of Dr. Dave Irvine who was a professor and electrical engineer at Calgary University in Canada. It started off by first through LED lighting PV systems and from there in the beginning stages it was functioning more as a foundation creating LED lights and then sending them off to communities and then eventually changed into a non-profit to where we are today and working with our primary offices in Calgary and we have a regional office, which is here in Lima, Peru. Over the years we have worked with over 220 organizations in roughly about 54 countries.

If you could move to the next slide please?

Right, so what are we currently doing now? So we started off focusing more on LED and then now we are currently working directly on projects that bring basic electricity services to off-grid areas. These are areas I think I mentioned before are areas that are very remote and rural, usually do not have a lot of assistance to receive electrical connections for maybe the next 5, 10 years plus. These are decentralized stand-alone systems for homes and also for community buildings. I think a big part of what we are doing in our organization, which has also been kind of repeated by a lot of panelists, is we are really focused on the life cycle of the project. So we start specifically with trying to locate and identify communities that are off-grid and do not have connections and they go through a process of understanding feasibility of what they are currently using, what their socio-economic status is, and then going through a process of training local technicians to do installations and also teaching and educating the end users. Then, as mentioned before with Carmen, a big part of what we do is the monitoring evaluation, which is an opportunity to understand how these systems are functioning and also to understand how well the end users are using the systems.

Can you go to the next slide please?

So let me go into a couple of the key aspects of how we facilitate off-grid solar home systems. These are some of the main aspects that we'd like to touch on.

Next slide please.

So a big part of what we start off with is partnerships and planning. You partner up with local organizations and also professionals that have a history of doing projects in the community and so in parentheses you are going to see Peru, which has an arrow going to transition and Guatemala and Costa Rica. So specifically this webinar is focused on Peru but we are also regionally in Latin America as well where we do projects in Guatemala and Costa Rica. In Peru we started off initially working with organizations throughout different departments and we are currently in three different departments throughout Peru. We are in Huancavelica, we are also in Apurimac, and also Loreto and traditionally we have always been working with local partners that are up in those areas. Given that we are an international NGO it is important that we partner up with locals that are in those communities because they have the best connection with the communities out in those areas. I'm going to probably touch a little bit more on the reason I put transition there and that's probably more towards some of the challenges and lessons learned because we are now going towards more of a model of working directly with local professionals that are leaders in the community versus organizations.

If you go to the next slide please?

Another key aspect of how we facilitate our project is through technical capacity. So we want to make sure that those that are living in these areas are very well trained and have the local knowledge to be able to maintain and install this equipment so we build capacity with local partners to have long term service providers. Then we also train community members to provide front-line tech support. Another key part is build critical mass. We are looking to be able to train the critical mass part of the people in these communities in order for them to be able to move forward and provide the service in the future.

If you move to the next slide please?

So one part is training local techs in the area. The other part is making sure that the end users, the beneficiaries, and families are well educated and understanding how to use the system properly. So when we do installs there is also a very grid focus making sure that each homeowner as well as their children are able to use the systems, they are able to maintain it and able to understand the safety behind the systems. At the same time it is very important that they are also connected to the local techs that are in those areas and also connected to anybody else that might not be in the area so we always have local techs in there but at the same time the local techs are connected to districts or provinces that are also in those areas and

then they are also connected to us as well in Lima if they ever need any other type of support outside the local area they are in.

Can you move to the next slide please?

Another key aspect of facilitating this project or our projects is system design, community conservation, and also project approach. Here you want to make sure that in every community we go to we have to be sure we are providing a system that is appropriate for that environment. Every community is a little bit different so we want to make sure that the system is well appropriate for that area and that our systems are also going to be modular so that they can be adapted or can be added on to, which is a great advantage of solar energy.

If you move to the next slide please?

So this is to just give you a little idea of an example of a system that we are currently using and this is a photo in Apurimac. One of the systems that we can see is very basic, very practical, using a 30W solar module and it is using a 12V/26Ah battery. We also provide four lights, which are LED lights. We use a charge controller, which deals toward charging. We also DC to DC converter, which helps us connect a small radio and also a cell phone charger. These are some of the basic amenities that we see that are in these areas where homeowners have small batteries for their radios and they are also having cell phones. So these type of amenities our homeowners are spending on an annual basis a cost. The techs systems that we are able to provide for these homeowners are within the budget that they are looking at and it is also providing the necessities that they need at the moment. So it is very important that we are not developing a system that is going beyond their needs or beyond their means, I'm sorry.

Go to the next slide please.

Another part that I briefly touched on talking about building critical mass—so we trained local techs and we want to make sure that the distribution channel in those areas are well created. So there are different areas where we were able to buy products within the communities and there are also some areas outside the communities and there are some products that we have to import from other countries. That is one of the challenges that I will mention in the challenges slide, for instance, the 12V LED lights we still did not purchase here in Peru. So to make sure the distribution channel is really solid and that there is a critical mass that's being developed.

Go to the next slide please.

Some of the lessons learned that we've had I think I might have jumped over a little bit with how long we've been here in Peru. So we've been started since 1997 as a foundation but then later moved on to operating as



a non-profit organization. We've been established since 2009. So these are some of the lessons learned that we've come up with in the past few years. Looking at the homesteads spread across various buildings—when we look at plug and play systems, the systems we are currently designing, we look at areas in these rural communities a lot of homeowners have different rooms and they are pretty far spread out in some areas and to have a plug and play system sometimes they don't meet the needs so designing an appropriate system that meets the needs of how homeowners are living currently is very important.

Also, local supply of products—there were some areas where we were able to buy some products in those communities but as mentioned before there are some products we have to maybe go to another district or maybe have to import. So that's also something that we've been looking to strengthen.

Also, an important part of our lessons learned is that technicians learn quickly with mentorship. It's important that in the trainings that we do that we aren't just training them one time and then leave. We are constantly monitoring and then following up. We have two training sessions that we usually carry out. One is based on how to install and learn more about solar energy but the next stage is to learn more about how to adapt and design systems for the homes. We are constantly working with these local techs throughout our time in those communities.

Go to the next slide please.

Some of the challenges that we've seen, as mentioned before for instance, we were still unable to find 12V LED lights so that is the one product that we have to ship in from other areas. Access to information is constantly an ongoing problem I think because the limitations of going to some of these communities, as mentioned before by some of the colleagues. Logistically to get to some of these communities are very very far out, hours and hours to get out there, so access to information locally can be challenging. At the same time maybe at a government level of understanding some of the current up-to-date information can also be a huge barrier. As the next point here you can see distances between communities, which also means that the cost of getting there and also one of the challenges for connecting the grid is really really hard because you're so far out.

Also one challenge that we see is that we do when we are training local techs and we are having the incentive for them to continue to take in the skills that they are learning to move on and provide those skills to other areas. The repeat of business is difficult because it is usually a one-time install and then trying to gather other people to come in can be a little slower sometimes. Currently right now there are homeowners that we have installed in are currently not ready to add on to their system. It might take a little bit longer.

If you move to the next slide please.

So kind of moving forward a little bit. Currently we are operating as a non-profit, but to be able to meet more needs of the communities and the local techs and the local partners we will be transitioning a little bit here in the next couple months into Social Enterprise. We're broadening up our range of systems that we offer, trying to really hone in more about what type of communities we are working in and being able to offer a variety of different systems so that if there are some beneficiaries that would prefer to have a system that has more accessories then we want to be able to offer those services. So we want to have a broader range of systems. Also, we want to move more toward a pay-as-you-go system. This will allow a little more flexibility with the homeowners and also move away a little more from the dependency of organizations having to subsidize more systems. Also I think a big part of our organization moving into Social Enterprise is that we focus heavily on training and also education. We want to be able to provide really good training not just to local techs but also to organizations and companies that are looking to work in communities around this type of field and technology. Lastly I will finalize it up here because I am kind of running out of time. It is that it is also very important to be able to look at some of the research and studies that are out there. For instance, the last point here is talking about the IDRC, which is the International Development Research Center, which is located in Canada and so we are currently exploring ways where we can draw on a study to look at some of the impacts of different electricity services from portable lanterns to solar home systems to off-grid mini grids and kind of see some of the socio-economic impacts from education to economic activities to social indicators to see how each one of them are functioning. I think I'm going to end it there so we have a little time for questioning and answering. So I want to thank once again everyone for listening in and also for also for allowing us to speak today on this webinar. Thank you.

**Sean**

Great thank you Chris and sorry for rushing you there. Just a reminder to the audience that those slides will be available at the Clean Energy Solution Center's training page and we will quickly move on now to the question/answer session. We might go a couple minutes past the hour here to get to a couple of the questions. If you can stay on the line and want to listen to the question and answer session we do appreciate that.

The first question I have is for Rafael and also Chris. The question is, are Practical Action and Light Up The World, are they working in the Puno region of Peru?

**Christopher**

I'll let Rafael answer and then I'll go ahead and follow up.

**Sean**

Sure, Rafael. The question is for you then.

**Rafael**

Is Practical Action currently working in the Puno region of Peru?

**Rafael's interpreter** Can you wait one second?

**Sean** Chris, why don't you go ahead and address that question. Is Light Up The World currently working in that region?

**Christopher** Sure, yeah, okay. Yeah, we're currently not working in Puno. We are currently working in three departments. One is called Huancavelica, Apurimac, and Loreto but from time to time we do work in other areas of Peru. For instance we recently just talking with an organization that is apparently in Puno and so we are working on seeing how we can assist them with the community out there. So the three areas that we are in, those are predominantly areas where we have local strong partnerships with communities and leaders but from time to time when a community or local organization approaches us we try to find any way possible to partner up with them. Currently we do have a local organization who would like to explore some ways to provide some local off-grid solution systems for the community. With that said, we do work in that area. Yes.

**Sean** Great, thank you Chris. Rafael, did you want to answer the question?

**Rafael's interpreter** Would you repeat the question please?

**Sean** Yes, the question was, is Practical Action currently working in the Puno region of Peru?

**Rafael** Yes, Practical Action is working currently in Puno.

**Sean** We will move on to the next question then. This question is for Carmen. Carmen, the question is what is the payback period for the solar home systems?

**Carmen** Thank you. Well it is difficult to say the payback period for every panel or every system. The point is that we say that we reach the breaking point is considering the whole cost that we have had from the very beginning just developing the Social Enterprise. Considering essentially and I have to say the most important part of the economics is not the cost of the PV panel or the cost of the system but the operation and maintenance. It is very difficult to say what is the payback of every system. There is no payback for the system. There is a service and then the price of the service and then when the breakeven it is possible to be reached. In our case with our economics more or less we need around 2,500 people, 2,500 families, 2,500 clients to ensure the economics work.

**Sean** Great, thank you Carmen and this next question was also directed to you Carmen but I think it will apply to Chris as well. How did you go about organizing the people in these scattered villages initially in order to create awareness to bring electricity to all and in what time frame did you achieve the objectives of the program. Also, did you do any baseline technical studies prior to the actual program? So, how did you organize people in the rural villages to bring awareness and in what time frame did you achieve the objectives and did you do any baseline technical studies?

**Carmen** Well, first of all, people...it is totally different the position of people in the committee in the local communities where it's not necessary particular knowledge of course, small training for these people. The people that we have trained for installation and then to work with us directly attending the incidents, these people have been selected in the rural region and it seems...I think there is the possibility to find people with the right skill to be prepared for this practice.

**Sean** Great, thank you and the next question is I think this applies to everyone but if you deal with awkward locations how do you attain low profiles for those places? Perhaps we could start with Chris. Do you have a response for that question? Chris you are still muted.

**Chris** Okay. I believe the systems that we are providing are systems that they have a certain capacity and so they are able to function off the floor lights, a small little radio, and also able function off a cell phone as well. So it has its capacity at that point. The transfers we are using for those areas are fairly well designed to the point that it is simplified for the homeowner using it to know when it is charged really well and not charging really well. If it ever gets to the point that the loads become too much the system will shut down. It is a very practical design of the system and homeowners are very well educated on how to use it and when. They might be alone but they can take control of it and shut it down at that point.

**Sean** Great, thank you Chris and I know we have a couple questions that we did not have time to get to but I will forward those questions to each of the emails of the panelists and they will try to respond as they can to those. Again, I apologize if we did not get to your question but I will forward those along to the panelists. A number of panelists or attendees are also asking for email addresses of the panelists. I will check with them following the webinar and we will provide those through email. I'm not ignoring that request but we'll take care of that after the webinar due to the time constraints right now.

I know we are holding people on the line so we will go ahead and wrap up the webinar with the survey. So this is just to evaluate how we are doing. Please just respond to the survey right within the window there.

The first question is the webinar content provided me with useful information and insight. The next question, the webinar's presenters were

effective. Then the final question, overall the webinar met my expectations.

Great, thank you for answering our survey and on behalf of the Clean Energy Solutions Center I would just like to thank all of our panelists again and for our attendees for participating in today's webinar. We very much appreciate your time and I would like to remind all our attendees that we will be offering the webinar again tomorrow, but in Spanish. So for any of our Spanish speaking attendees, please feel free to join up for that as well. Again, the PDF version of the slides will be available at the Clean Energy Solutions training page at [cleanenergysolutions.org/training](http://cleanenergysolutions.org/training). You can download those there to view them. We are also posting webinar recordings to the training page as well as the Clean Energy Solutions YouTube channel where you can find other videos on there as well. So please allow one week for the audio recording of the webinar to be posted. Again we invite you to inform your colleagues and those in your network about these Solution Center resources and services including the Ask-an-Expert policy support. With that I hope that everyone has a great rest of your day and thank you for sticking with us a little over the time here and this concludes our webinar.