

Exploring Opportunities for PAYG Solar as a Driver of Financial Inclusion

—Transcript of a webinar offered by the Clean Energy Solutions Center on 26 September 2017—
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Webinar Panelists

Jem Porcaro	United Nations Foundation
Daniel Waldron	Consultative Group to Aid the Poor
Amy Paul	USAID Global Development Lab
Craig Jolley	USAID Global Development Lab
Simone Vaccari	PEG Ghana

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Hostess

Today's webinar is focused on exploring opportunities for PAYG Solar as a driver for financial inclusion. Before we begin I'll quickly go over some of the webinar features. For audio you have two options. You may either listen through your computer or over your telephone. If you choose to listen through your computer please select the mic and speakers option in the audio pane. Doing so will eliminate the possibility of feedback and echo.

If you choose to dial in by phone please select the telephone option and a box on the right side will display the telephone number and audio pin you should use to dial in. If anyone is having any technical difficulties with the webinar, you may contact the go to webinar's help desk at 888-259-3826 for assistance. If you'd like to ask a question and we ask that you use the questions pane where you may type in your question. If you're having difficulty viewing the materials through the webinar folder, you may find PDF copies of the presentations at cleanenergysolutions.org/training and you may follow along as our speakers present. Also, the audio recording and presentations will be posted to the Solutions Center's training page within a few days of the broadcast and will be added to the [Solutions Center YouTube channel](#) where you'll find other informative webinars as well as video interviews with thought leaders on clean energy policy topics.

Finally, one important note to mention before we begin our presentation 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 practice resources reviewed and selected by technical experts. Today's webinar agenda is centered around the presentations from our guest panelists, Jem Poracaro, Daniel Waldron, Amy Paul, Craig Jolley, and Simone Vaccari who have joined us to discuss financing challenges and solutions at the cutting edge of energy access sector.

Before we jump into the presentations I'll provide a quick overview of the Clean Energy Solutions Center. After the panelist presentations we'll have a moderated discussion with the panelists followed by a question and answer session where they'll address questions submitted by the audience. At the end of the webinar you'll be automatically prompted to fill out a brief survey as well. So thank you in advance for taking a moment to respond.

The Solutions Center was launched in 2011 under the Clean Energy Ministerial. The Clean Energy Ministerial is a high level global forum to promote policies and programs that advance clean energy technology, to share lessons learned and best practices and to encourage the transition to a global clean energy economy. 24 countries in the European commission are members covering 90 percent of clean energy investment and 75 percent of global greenhouse gas emissions. This webinar is provided by the Clean Energy Solutions Center which focuses on helping the government policy makers design and adapt policies and programs that support the deployment of clean energy technologies. This is accomplished through the support and crafting and implementing policies related to energy access, no cost expert policy assistance and peer to peer learning and training tools such as this webinar.

The Clean Energy Solutions Center is cosponsored by the governments of Australia, Sweden, and the United States with in kind support from the government of Mexico. The Solutions Center provides several clean energy policy programs and services including a team of over 50 global experts that can provide remote and in person technical assistance to governments and government supported institutions, no cost virtual webinar training on a variety of clean energy topics, partnership building with the development agencies and regional and global organizations to deliver support and an online library containing over 5,500 clean energy policy related publications, tools, videos and other resources.

Our primary audience is made up of energy policy makers and analysts from governments and technical organizations in all countries. But we also strive to engage with private sector NGOs and civil society. The Solutions Center is an international initiative that works with more than 35 international partners across its suite of different programs. Several of the partners are listed above and include organizations like IRENA and the IEA and programs like SE4ALL and regional focused entities such as ECOWAS and the Center for Renewable Energy and Energy Efficiency.

A marquee feature of the Solutions Center provides a no cost expert policy assistance known as Ask an Expert. The Ask and Expert service matches policy makers with more than 60 global experts selected as authoritative leaders on specific clean energy finance and policy topics. For example, in the area of finance for energy access we are very pleased to have Harish Handy, founder and chairman of Cellco India serving as one of our experts. If you have a need for policy assistance in finance or energy access or any other clean energy sector we encourage you to use this valuable service. Again, this assistance is provided free of charge. If you have a question for our experts please submit it through our simple online forum at cleanenergysolutions.org/expert. We also invite you to spread the word for this service to those in your networks and organizations.

Now I'd like to provide brief introductions for today's panelists. First up is Jem Porcaro who is the senior director of energy access at the UN Foundation where he's responsible for providing leadership management and project support to the foundation's energy access work. Following Jem, we'll hear from Daniel Waldron who is a consultant working for the consultative group to assist the poor in specializing in digital finance. Following Daniel, we'll hear from Amy Paul who is a science and technology policy fellow at USAID's global innovation lab. Presenting with Amy, we'll also hear from Dr. Craig Jolley who is a data scientist at USAID's center for digital development. And our final speaker today is Simone Vaccari who is the country director with PEG Ghana. And with those introductions I'd like to welcome Jem to the webinar. Jem?

Jem Great. Thank you and I am going to make—try to share my screen now. Can you hear me?

Hostess Yes. Loud and clear and we can see your screen.

Jem Great. And you should be seeing a Power Point momentarily.

Hostess Yep. It's crystal clear.

Jem Ok. Great. Ok. Good morning, good afternoon, good evening everyone. Again, my name is Jem Porcaro. I'm the senior director of energy access here at the UN Foundation, really pleased to be cohosting what I think is going to be a really interesting discussion on pay as you go solar and its role in driving financial inclusion. If registration numbers last night are any indication of the interest in this webinar I think it's quite high. I think we had something over 300 people registered for this. So again, many thanks to all of you who joined including all of our guests. My role really is just to serve as moderator for the webinar. Our guests are kind of the key feature of this webinar.

But let me before I kind of hand it over to them, just a quick background on the Energy Access Practitioner Network. I'm sure many of you on the line are a member of the network. But for those of you who are not familiar with us, we're basically a network of energy access practitioners around the world established in 2011 really for the purposes of connecting practitioners with ideas, resources and opportunities in the energy access space. We have over

2,500 members representing roughly 1,400 companies, organizations, working in one way or another on energy access issues around the world. And with a particular focus on distributed energy and distributed renewable energy. You can sense of the kind of technologies that our members represent. It's through the practitioner network that we're bringing you this webinar.

I think we all know what the webinar is about. We just wanted to mention that this is the second in a series, a financing webinar series that we have as part of the practitioner network so more to come on this topic. And some details around how to follow us on social media. So again, I kind of mentioned what the rationale of the background was for this. I don't think I need—I think it's no surprise the increasing role that pay as you go is playing in driving the market for off grid energy access particularly in east Africa, other parts of Africa and south Asia. This webinar really stems from a recognition I think across the sector that financing and consumer financing are really critical to unlocking energy access in Africa and in Asia.

This is reflected in some recent survey results that the practitioner network conducted last year as part of our annual survey where basically access to finance and access to finance for customers were really ranked at the top of a set of barriers that those industry and investors ranked as part of—they ranked kind of depending on how important they thought those issues were to growing the distributed energy sector at large. We also found again not surprisingly and as many of you know that one-time cash payments are still dominating this sector with pay as you go growing rapidly but rapidly in only certain parts of low and middle-income countries.

And then lastly, kind of again just reinforcing the point that upfront costs remain one of the biggest barriers amongst households in the adoption of distributive energy products. So with that kind of market intelligence and other market intelligence that we know exists out there, we wanted to really pay particular attention to this topic of pay as you go and its role in driving financial inclusion. So that's just a little bit of background. Again, I'm kind of just moderating this. I will tee up some questions at the end.

But at this point I want to hand things over to Daniel from CGAP who is going to provide a little bit of background scene setting for pay as you go. And then after Daniel, Amy and Craig from USAID Global Development Lab are going to discuss a new rapid assessment framework for pay as you go solar and mobile money adoption which should be very interesting. And then last but not least Simone from PEG Ghana is going to provide kind of a practitioner perspective to round things out. So with that—and I think all of our speakers have roughly about 15 minutes. I encourage everyone to kind of try to stick to that because we really want to allow enough time for the discussion at the end of the webinar. So with that, I'm going to hand it over to Daniel.

Daniel Thank you, Jem. Really appreciate it and hello everybody. Happy to be here today. So as said repeatedly my name is Daniel Waldron. I work on the digital finance plus work stream for CGAP, the consultative group to assist the poor. The presentation is showing all right there.

Hostess

That's great, Daniel. Thank you.

Daniel

Fantastic. So Jem really kind of answered I think the top question here so I won't linger too long on this. But I always ask to begin with what problem does something solve. So in this case, pay as you go really exists to solve a particular problem in energy access which you have IEA estimating about 25 percent of the energy access gap—about 1.2 billion would be most cost effectively electrified using distributed energy. So those are the approximately 50 million rural households who live in sparsely populated areas where grid extension and micro grids are probably going to be loss makers for the foreseeable future.

And so, the good news is that distributive energy is simple, right? You make a sale, you get a kit to a house, you introduce installation but in almost no time you've achieved tier one to two access. The bad news is as Jem said, the cost is still far too high. These are rural households in remote areas. Incomes are low and so the upfront cost for energy access is simply too expensive for the people to purchase outright. So obviously we want to finance these homes, simply want to see more consumer credit here. This is not a new idea. I believe I could get a loan in India for a solar home system in the mid '80s. But we have seen historically fairly low uptake. The early experiences saw problems with product distribution and maintenance. Real issues in coordination between various entities if there was a different seller and a financier. And I'll talk more about that later.

And the important fact that most of these loans required cash collections from clients that just simply by definition are really hard to reach making the loans very expensive to serve. The end result being very low repayment rates and we couldn't get good financing for distributed energy. Enter pay as you go solar. So I think most of you probably have some idea of how some idea of how pay as you go solar works. But for those who don't I'll offer just the sort of bare knuckles look at how it actually works. It's a deceptively complicated product and there are a number of versions, some of which I'll discuss but most of which I won't because they're not relevant today. But all, most I hope pay as you go models have a few things in common.

There's the sale of the solar home system to a customer for a relatively small deposit, usually between about 10 and 25 percent of the total unit price, closer to 15 I think is probably the industry average or so. Then that device is used on a prepaid basis and the payments are time based so chronometric and volumetric. So users are purchasing energy days and not kilowatt hours. And once those days run out the unit shuts off thanks to lock up technology that interrupts flow from the battery to appliances. And some units actually have a GSM modem and there's M to M connection. Some are basically running on timers with codes that are inputted that reset those timers for the number of purchase days. So the customer when it runs out must load credit again and

the unit will reactivate. And generally, the customer can pay as much and/or as often as they like.

There's also remote collections. So due to the nature of the customer basis I just said, PAYGo providers rely almost exclusively on mobile money payments which allows them really to effectively just outsource cash collection to this existing mobile money infrastructure, this group of agents that are present in most rural areas although not all as Amy and Craig will talk about. And the end result is pay as you go solar. You have a financed, well maintained solar home system whose payment patterns adjust very nicely to meet the requirements of low income off grid households.

There are two main models of pay as you go solar that we see. The first is energy as an asset where the user has a route to eventual ownership of the system. After a set period of time, the unit unlocks. And the second is energy as a service where you have a provider distributing as many systems as they can for a lower cost and then managing them as sort of a distributed utility. We have seen thus far that over 80 percent of pay as you go sales have come via the consumer financing energy as an asset model wherein the customer pays usually 12 to 36 months and the loans—and then owns the unit at the end of that period. So this is the M-KOPA, PEG, Phoenix model. Those are a number of providers.

It's worth noting that most of those providers offer greater or lesser degrees of flexibility in that repayment but they all offer some. So the 12-month loans are very often paid back in 13 to 14 months and there are no compound—there's no compound interest and there are not arrears in this loan model. So if I don't pay Monday or Tuesday, my unit sits dark, my household lives in darkness. But I can then make a payment on Wednesday morning for a single day and my lights come on immediately. I don't need to clear my past arrears and there's no compound interest so I don't suddenly owe more because I didn't pay for a period of time. I've basically agreed to buy 365 days of energy if it's a 12-month plan. And I can buy those 365 days over a longer period than 12 months without incurring an additional cost. This is a really powerful financing model. It's very intuitive and people seem to react to it very well. It does raise issues on the back end in terms of getting sort of the wholesale that you need to finance it but we can talk about that a little bit more later. And I think overall, we see it as being a real success.

The energy as a service model is falling more out of use in the last year or two for a number of reasons. A distributed utility model is close to what it is but not exactly. Providers generally mandate some level of purchase, so buying 80 percent of the days. And we just see I think general declining rates of payment over time for it. But happy to talk more about that later.

So how big is pay as you go solar? Current estimates—I'm going off of Bloomberg and just some personal estimates of various providers put us at about a 1.2 million sort of sales or installations mostly since 2011. That's approximately 6 million people have been able to access modern lighting and charging. Pay as you go providers are unique in a number of ways so they have largely designed their own hardware and software. They manage their

own sales, distribution, underwriting, financing, servicing and maintenance, all of that internally. That's not true for everybody. PEG in fact we'll here from later that actually licensed their hardware and their software. But for most of the big providers this is true.

And that vertical integration does provide a number of challenges certainly and we can talk about those but also providers a really strong customer facing product that really integrates well servicing, financing, all in one package where the customer is a single point of contact. These companies have attracted a sizeable amount of equity and increasingly debt from western investors with well over 500 million total commitments. And I expect that to go up pretty significantly before the end of the year. And we've seen them in a _____ report that September of 2016 pay as you go solar attracted 1.6 million monthly mobile money transactions. So they're providing a real use case there which I'll talk about in just a second.

So I come from the Consultative Group to Assist the Poor which is a research center focused on financial inclusion that sits within the world bank. I work on an initiative called digital finance plus and we look at how digital finance, usually mobile money can help to address real world development challenges. I focused on energy access. So pay as you go is the most powerful example of this thus far. And we see them as doing two things to really drive digital finance uptake in this kind of virtuous circle. So one, they offer a tangible use case. This motivates people to sign up for and start using mobile money. We see a lot of signups that remain inactive. We don't see that as much with pay as you go.

Somewhere between 15 to 30 percent of PAYGo customers depending on the market are brand new to mobile money. In Uganda, Phoenix International reported that over 90 percent of their customers had never made a bill payment before they acquired PAYGo. And second, the regular payment activity coming from PAYGo clients can really help to improve the business case for mobile money providers. So research that I was able to manage together with PEG and Ghana indicated that PEG users on a given mobile money platform were generating over twice as much revenue per user than an average customer.

And this was not just bill pay fees. They also cashed in and out more frequently. They made more P to P transfers and just generally were overall more active clients. We've heard that similar internal assessments from mobile money providers have seen similar results and GSMA is launching a larger work stream here. But we're confident saying that these are really good mobile money clients and that providers like this really are able to drive uptake in a way that just general growth at a higher growth rate than you would generally see in a mobile money deployment.

But the potential actually goes quite a bit deeper than just digital finance. Digital finance is just a means to an end, right? But at the end of a PAYGo loan there are three assets in place which make an ongoing financial relationship possible and a relationship that really leads to tangible results for the customer. So the first asset is a remotely securable piece of collateral. So

if a customer now owns the unit, they can choose to refinance it in order to secure additional loans. The second is the rich payment history from the last 12 to 36 months of payment and usage history which the provider can use to customize additional product offerings. They can choose to finance a stove, a television, a smart phone, all the sort of assets that a customer would have difficulty acquiring if they have to pay cash up front. And lastly, there is this established digital payment channel which enables the customer to apply for and repay any additional loan or other financial product at very low cost to the provider.

And so, this is all coming together to create a new type of asset led financial inclusion that produces more asset financing, consumer financing for assets that people really value. This could mean more education financing as we've seen in Uganda with Phoenix. Sorry. Going slightly out of order. We've already seen M-KOPA give out 150,000 follow on loans. That's on about 550,000 solar home systems distributed. That's 150,000 additional loans given to customers who have repaid on time or within the sort of parameters set up. Phoenix and CGAP are working on a project in Uganda to offer more flexible school financing to overcome the barrier that school fees represent for poor households. And I'm sure somebody else will talk about it later.

PEG Africa is actually offering health insurance to good payers because they see that the number one payment disruption is people getting sick and being forced to miss time on their payment. But if they're good payers you don't want that household to be sitting in the dark during a time of stress and they partnered together with _____ to offer a really powerful product to help overcome that. We could see it going even farther. I mean coming in 2020 a solar bank, you could see a world in which such a provider could apply our banking license to give mobilizing deposits to offer additional value to the customer as well as to fund their growing portfolio and we see certain parallels to have the retail banking sectors developed in Latin America where you had people selling durable goods that were suddenly able to mobilize deposits and to transform their businesses and offered really powerful consumer financing and consumer financial services to the base of the pyramid.

So that's all of the good stuff. So what are the major challenges for pay as you go solar? What I just talked about is sort of lowering the cost of funding. This is crucial because pay as you go is a distinctly capital-intensive model. You're putting a piece of equipment in somebody's house and hoping they're going to pay for it over the next one to three years and that's on the lower end. Pay as you go providers often suffer from a shortage of working capital. And as of yet they do not have easy access to commercial grade debt. Especially not in local currency. We're certainly hoping that will change and I know USAID and others are working to help that change. We're not quite there yet.

So the difficulty in attracting commercial grade debt stems mostly from the sector's relative youth as well as the lack of one clear business model. You have 12-month, 36-month, 120-month loans being offered. And calculating

portfolio health is very difficult given the flexibility I just described as is underwriting sort of zero file customers who have really no credit history at all. So that's sort of the largest kind of barrier we see to extension. But there's also the nature of the loans. So we at CGAP tend to view these as consumption loans. There's an argument that the energy savings for switching from kerosene to solar may offset the price of the unit and we think there's a story there but it probably doesn't completely get you to day one savings on the unit. But these are an incredibly important type of consumption loan which brings people benefits from energy access that they value immensely. But as providers offer more and more of these loans as upgrades, is there a limit to repayment capacity? We don't know that I think completely yet.

So third, there is debate over whether this is the model that will actually allow us to reach the bottom of the pyramid, the people living on less than \$2.00, less than \$1.00 a day or if you still might need targeted subsidies or even a different type of product entirely to make that work financially. And lastly and then what I'm really excited to hear Amy and Craig talk about today, over 90 percent of the sale in pay as you go have been in just four markets so Kenya, Tanzania, Uganda and Rwanda and just by the phenomenal work that PEG has done in Ghana and _____, there's exciting potential in west Africa. There's huge potential in markets there beginning to open up in Ethiopia and Nigeria. But there are many factors that go into successful pay as you go market and not all of those are in place at where we would want them to be just yet. So acknowledging that this is still the beginning of this story and much work remains to be done, we remain quite optimistic and incredibly impressed as the success providers have seen thus far. And with that, I'll turn it back over to Jem and thank you for the opportunity.

Jem

Daniel, thank you very much for that. I think that was a really good overview of PAYGo. I think it sets the scene quite nicely for Amy and Craig to talk about their route in assessment framework for PAYGo solar and mobile money adoption. I certainly have a couple of questions but I'm going to reserve all of my questions until the end so that we can hear from everybody. But thank you again Daniel and I'm going to hand it over now to Amy and Craig.

Amy

Hi. So can you hear me all right?

Jem

We can.

Amy

And hopefully you're seeing a slide from US Global Development Lab, the great picture on the front.

Jem

We do.

Amy

Great. So Craig and I both work here in the Global Development Lab in something called the Center for Digital Development. And one of the core focuses of our center is expanding access to digital financial services and supporting financial inclusion. We also have colleagues across the agency with the mandates of scale off grid energy. And this work really came about as a collaboration between these two teams to sort of say in recognition that

pay as you go solar can be a driver of mobile money adoption, where can we work together? And if we were interested in identifying a new market whether as a funder or as a new company, what are some things that we should be looking at in terms of the infrastructure of the country that would give us some indication of whether or not there's a good opportunity to advance both the goals of scaling off grid energy and finding financial inclusion.

So what we came up with is a framework. And just to give you an overview of this, it's structured around five open ended questions that bring together aspects of the energy, mobile and business environment. Each question is associated with multiple possible indicators or distinct measurements that you could look at and we've also identified several data sources that you could use to answer these questions. So what we're going to do is run through the framework, each of the questions. And then once we go through that we'll apply it to a sample of sub-Saharan African countries so you can see the kind of results that it's been able to give you. Just a quick caveat that the assessment here is again meant to be sort of a rapid overview to start discussion. There's always more data that you might want or could do and we can talk about that more later. But this is just meant to give you sort of an initial overview of a new market.

So the first question is how broad is mobile coverage? There's lots of different models that pay as you go solar companies can use but if you really want to drive financial inclusion and mobile money adoption you need to have mobile signal. The second question looks at how much of the country is unelectrified. So we're not just interested in where there's mobile coverage. But given that pay as you go solar is primarily going to be of interest to those who are off the grid and then secondarily as a backup for those with unreliable grid access, we're interested in looking at what is that electrification infrastructure in the country.

The third question looks at the mobile money infrastructure. So again, the idea is that adopting a mobile money repayment option is going to be a lot easier if there is some existing infrastructure in the country. Are there mobile money providers? Are there agent networks? Do clients have any familiarity or experience with sending money using mobile phones? The fourth question looks at how affordable is home solar ware for target populations. So off grid households are likely to be low income, fuel subsidies in many countries can make it harder for solar energy to compete. And so, we have a couple of indicators looking at this aspect of the market.

And finally, we have several indicators related to doing business. And as Daniel laid out, pay as you go solar companies have some very unique business needs, high initial capital. They're often importing the hardware for their systems and there's a reliance on local human capacity. It's a very service oriented type of company. So we're going to dive into the framework with some actual countries and data and show you what some of the results are and I'm going to turn it over the Craig to walk through the first part of the framework.

Craig

Hi. So as Amy mentioned this first question is how broad is rural mobile coverage. And we phrased this question in a way that was sort of intentionally vague because there are several different ways of measuring that which we associate with different data sources. I'll walk through what a couple of those might look like. The first one is really kind of a geographic perspective where we're thinking about household surveys where people are going around and asking whether people have a mobile phone in their household. And we want to know in which countries do most rural areas—sorry. In which countries do the majority of people in rural areas say that they have mobile phones.

So we were drawing data from the demographic and health surveys and we looked specifically at rural areas and asked at which rural sampling sites more than 50 percent of the population says that they have a phone in their home. As you see, there's quite a bit of variation here ranging from places like Senegal and Ghana where it seems there's very, very broad mobile ownership in rural areas to places like Malawi and Liberia where it seems like there's a lot of rural areas where most people don't have a phone which would lead us to think that maybe there just isn't enough signal there for it to be worth it to have a phone.

Another way to think about mobile coverage is to look at mobile adoption. So GSMA measures things a little bit differently. They ask about the number of unique subscriptions in a county. So this is well capable of going above 100 percent of the population but you can see that all of these countries we're looking at have seen dramatic growth in the last several years but not all at the same time or at the same rate. And then it's also possible to get data from mobile network operators where they are self-reporting on where they think that they have mobile coverage. So you see examples from Kenya and Zambia here where you're seeing a lot of 3G in large urban centers and then 2G in populated areas outside of those and then nothing in a lot of other places.

So the second question is also to some extent a geographic one looking at how much of the country is unelectrified. And our goal to tool here has been going back to looking at these household surveys where households are asked not only whether they own a mobile phone but also whether they have electricity. And so, based on the answers to those two questions, we can separate the population into essentially four different groups. And the group that we're most interested in is this section on the left here where you have mobile owners who do not have access to electricity. And so here comparing a set of sub-Saharan African countries we see quite a bit of variation here as well. This time Liberia comes out on top as having a lot of people who have phones but don't apparently have access to electricity as opposed to markets like Nigeria or Ghana where at least nominal electricity rates are a lot higher in that segment of the population that has a mobile that does not have electricity so something narrower.

This is another way of visualizing the same sort of information. And this time we're laying it out geographically. There's a lot going on in this map. The first thing to look at is this shading from blue to red to purple where the blue

is areas of high mobile ownership. The red is areas of high population density. And then of course the purple areas have both and you see a lot of mobile coverage virtually everywhere in Uganda except in the northeast. And then the yellow cross hatched area there is the area where according to a model we're seeing a higher than 50 percent rate of electricity access. So that's really restricted to the urban area around _____. So from this type of analysis you can get a sense of not only how many people have mobile phones but not electricity but also where they're living.

So the third set of indicators was thinking about the strength of the mobile money infrastructure. And again, there's a variety of ways to measure that. We're drawing from a few different sources. The most basic one is looking at mobile money account ownership. And so, what we're seeing here is a scatter plot on the x axis the rate of reported mobile money account ownership. And this is coming from the World Bank's global _____ survey. On the y axis we've got the UN human development index just as a way of spreading these points out a little bit. The red points are countries in sub-Saharan Africa and the blue points which are not labeled are countries in the rest of the world essentially.

And so, you see Kenya obviously leading the pack way out front. And a lot of these countries that were mentioned as the early leaders in PAYGo solar, places like Tanzania, Uganda, Rwanda are also in this area of having much higher than typical rates of mobile money ownership. But you see a few other countries there as well where there might be potential to be growing PAYGo in the future based on high current rates of mobile money.

Another way to think about the strength of mobile money infrastructure is not just how many accounts there are out there but how actively people are using these accounts. So this is an example from a question in the global index survey where people were asked whether they use a mobile phone to pay utility bills. And these results are sort of proportional to what we saw before where you've got higher rates in Kenya. Uganda, Tanzania, Rwanda sort of filling in that middle area. You can also for an individual country break things down according to what people use their mobile money accounts for. So in most places, the dominant usages are for sending and receiving money. Things like school fees or utility bills are being done by a much smaller bracket of the population.

The other thing that's interesting here is we—when we started doing this we naively expected rural areas to be lagging far behind the rest of the country in mobile money usage. In a lot of places, in Uganda especially that really seems not to be the case, that rural areas are mostly keeping up with the urban areas as far as most measures of mobile money.

So another key component to mobile money infrastructure is the mobile agent network. This is data from the mixed inclusion lab looking in particular at Tanzania where you see a distribution of mobile money agents around the country and a sense of which district those mobile money agents are operating. It's also possible to normalize this by population density so that we're getting a sense of what the supply and demand ratio is assuming that

demand is proportional to the number of people. How does the number of mobile money agents compare with the overall number of people in the district? And I'll turn it back over to Amy for the last one.

Amy

Yeah. So picking up at question four. We're looking at the affordability of home solution target populations. And again, a couple of different ways to go about looking at this. So the first is to look at the income level of off grid populations. And this is a bit of a complicated graph. So it's very hard to find data specifically on the income levels of off grid populations. And what this figure is doing is assuming that households that are off the grid are more likely to be the poorest segment of the population. So what you see in the bars is the income level of each country, blue being the population living on less than \$2.00 a day, green being the population on \$10.00 a day and purple being those above \$10.00 a day. The black line shows the off-grid population.

And so, when you look at the area that's below the black line, that's the population, the off-grid population and the distribution of their income. So this is relevant to the products that off grid companies can offer, right? It's going to assume that the population needs to be in this \$2.00 to \$10.00 a range to be able to afford a solar home system. Below that they might be looking at a smaller product. So if you look at that sort of green area, the \$2.00 to \$10.00 that's below the black line, that sort of a segment of the population that's living on that \$2.00 to \$10.00 a day range. And again, you can see some variation. Ethiopia, Kenya, Uganda tend to have a fair amount of the population off grid that is in that \$2.00 to \$10.00 a day income bracket whereas other countries the majority of the off-grid population is on the less than \$2.00. Again, assuming that those off grid are the poorest parts of the population.

Another way to look at this is just what are households currently spending on energy. So from the UNEP Enlighten Initiative country lighting assessment there is data available on average expenditure, on energy alternatives. It breaks it down by kerosene, candles and batteries. And again, you can see a range in Ghana of a bit higher current expenditure on energy alternatives to about \$0.35 a day to about \$0.10 lower in Ethiopia. And then finally, we can also look at subsidies. It's also there's some information from the international energy agency looking at whether there are fuel subsidies. Mostly this is not the case now for sub-Saharan African countries. You can see a few here that have fuel subsidies as of 2015. But again, it's also important to note that even though there may be a formal policy around fuel subsidies that doesn't necessarily reflect what people are paying on the ground and we'll get to hear from PEG later we'll get a better sense of how much these sort of high level indicators match up with what people actually experience.

And then the last question is how easy is it to business. So again, there's lots of different indicators that you could look at to give you some sense of the business environment. And again, the challenge is always going to be what are these high-level indicators and how closely do they mimic the experience on the ground. But we pulled a few out from the World Bank's doing

business index. So again, this is just an index score that combined ten different indicators on doing business and ranks countries relative to each other. So if you look at that score, Rwanda was on the top of the sampling of countries in terms of just a general index score doing business.

You can also break it down and look at specific indicators within that index. So one you might look at is the time and cost to import goods, right? If you're importing equipment, you can see here quite a range in the time that it takes to clear things across borders as being quicker in Uganda than in Tanzania. Although that doesn't seem to have some of the companies there. You could also look at the tax rate in terms of the percent of profits the companies are expected to pay and again, seeing quite a range across different countries in sub-Saharan Africa.

Another thing that you can look at is the human development index. So this is one place we looked at to try to get some sense of the work force capacity in a country. There are again lots of variables you might look at, literacy, your schooling, government expenditure in education. We've shown here the population over 25 with some secondary education just to give a sense of what a local workforce capacity might be and how much training and investment a company might need to find a—be able to sustain a work force for their service needs.

So that was a really quick run through of our framework. This is available now linked on our digitaldevelopment.org site. And if you saw something that you were interested in or you're interested in a different country, what we've laid out here is each of the framework questions, the indicators we looked at and the data sources that you could use. And so, you can do it yourself if you're interested. Most of the data sources that we used here and included in this presentation are publicly available. So we're hoping that that's still the case making it available to those who are interested. And now I'm going to turn it back over to Simone to hear a little bit about their experience in Ghana.

Simone

Thank you very much. Can you hear me?

Jem

We can, Simone.

Simone

Brilliant. Thank you very much for hosting this very interesting webinar. And what I'll do now, I'll take you through the experience of PEG Africa in Ghana and how actually some of those questions that you guys have been exploring for sales market reflect on the ground. First of all, a bit of a background on PEG Africa in Ghana. It started off three years ago doing pay as you go solar here after a few pilots with some other solar systems. We have today approximately 30,000 customers and we have a team of about 160 full time employees plus approximately 200—250 field based agents. These are the agents who are going to communities, reaching the last mile and selling to our customers. We have been selling so far both the M-KOPA product and D.Light solar home system. And we are just starting now with the solar TVs which customers have been craving for a while.

We did something similar to what you guys have been taking us through in the previous slides of why should we go to Ghana compared to other countries in West Africa. And I think one of the decisions that we took at the time was around how easy it was to do business in Ghana and Ghana being a very stable country in West Africa. If you were to compare it a few years ago to the likes of Ivory Coast or Nigeria, Ghana has been always standing out as the hub within West Africa. Also, Ghana is quite a rich country from a BoP standpoint. So we do have a good volume of customers which are in between the \$2.00 and \$10.00 a day that are off grid or have a very unreliable source of grid, the grid is very unreliable. And the cost of energy as we saw in the slide before actually, it's quite high. The subsidies that the government places on energy are quite low so customers are really spending a lot of money buying kerosene, buying batteries, buying candles and they've been looking for an intelligent solution and there was no proper alternative at the time.

With respect to mobile money and mobile coverage, Ghana has quite a broad rural coverage with respect to most people have a mobile phone. Mobile money hasn't yet been adopted as much as in other countries as the population is not really early adopters as you would have in some countries in east Africa such as Kenya or Rwanda for example. But pretty much everyone has a mobile phone. Everyone knows how to make a call. And so, the time we believe that that was a very good indicator of potential uptake of our solar home systems.

Now these were the key drivers for decision into coming within Ghana. What we have realized by setting up corporations and working for the past three years is that these indicators vary a lot from initial assessment to reality. Let me just focus a bit on the mobile coverage standpoint whereby telecos are very much focusing on building a natural infrastructure in urban areas or areas where there are clusters of communities living. Whereas in Ghana the people are not as densely populated as in other countries and as such a key struggle which we've been facing within our business has been the coverage for our customers' mobile phones. And of course, without coverage we wouldn't be able to lose the phones for paying with mobile money nor reaching us if they need any support.

If we deep dive into that in particular, so if we look at mobile money and the key challenges within that, mobile money is our key enabler. As in we're not accepting customers paying as they are coming to our shop and paying with cash. We want to make sure that as a scalable business we accept payments only coming via mobile money. Key challenges besides the network availability which I briefly shared with you previously—other challenges were around customer's ability to use mobile money. What we are experiencing is that the majority of the off grid rural and privileged customers that we are selling to actually have no exposure to mobile money. They have—70 percent of them have not been using mobile money before they came to PEG so we had to perform all of the education on that to be able to get them to accept and use this new tool which is not as easy as it might look if you haven't been using your phone for anything else than making calls.

Secondly, those customers which had been using mobile money only had been using it for making peer to peer payment transfers so either to receive money or to send money. So what happens is that they are not comfortable actually navigating the menu to pay the bill and bill could be our bill or could be bill of other companies. And since there is not such an ecosystem of mobile money in Ghana, actually most customers don't really have a need of using mobile money to pay any bill leading them to actually only transfer money from their bank to rural areas. And when we onboard them and ask them to pay us by mobile money they struggle with the menu. It's more complicated.

Not only this with respect to the ability of using mobile money. There's a key challenge with respect to the prices of mobile money agents in the rural areas. The telcos especially in Ghana are very much focusing on the urban areas and rural are not having as much of a chance because of the lower transaction volumes that these agents would be generating. And as such telcos are not really investing the infrastructure, the branding onto setting up those agents and the _____ which are setting up by themselves as agents actually are having a hard time to survive over time because the commission structure which the telcos are having for urban or rural agents is the same. As you can imagine the volume of transactions is you are urban or rural is drastically different and rural agents are the ones suffering. Meaning our customers wouldn't be able to find as many because the ones that are bold enough to set up operations would fail a few months.

And lastly, many of the agents that we find in rural areas do not have enough liquidity to manage all of our customers' payments. Our customers have to pay something similar to \$12.00 per month. We have clusters of customers into a community, we're talking about 20, 30, 40 customers into a community, the agent wouldn't have enough liquidity to be able to pay all of those customers bills. And he would need to use resources to go to the main town to cash in and cash out. And as you can imagine if the commission which is being paid to the agent is what's left for the number of transactions being performed, then the agent has challenges in surviving, in paying us and this is just compounding the problems we've been facing within payments expected from customers.

We have been trying to tackle those three pain points in a variety of ways, initially trying to find potential partners that could support us with respect to setting up agents and managing agents' liquidity. Also, to feeding with information telcos and asking them to simplify their menu to allow more customers to be able to use it. But we haven't really received that much support from those parties which had other priorities compared to tackling the rural electricity that off grid customers that we have. And as such we had to buckle up and tackle those challenges head on by ourselves trying to come up with a novelty of models expanding our scope of operations and trying to be also a super agent in all mobile money, trying to create our own solutions for mobile money because this was the only way we could accelerate adoption of mobile money from our customers.

So as we can see here, three things which we have done are really revolving around simplicity. We need to make sure our customers have the simplest possible way of using mobile money. If that is the way we believe would allow us to scale faster and in a leaner way. So focusing on simplicity what we do now is we register more of our customers at point of sale to mobile money which has been a long and challenging path to embark on. But finally, we are there. We're able now to register every customer when it comes to mobile money and this insures they will not have to struggle to find an agent in the rural area which is able to get them registered onto mobile money.

Secondly, we have commissioned a third party to develop a dedicated solution for customers to pay us using mobile money which is _____ for one click payment. If customers before paid had to undergo about seven steps in the teleco mobile money menu, leading many of them of making mistakes or becoming confused. Now we have a stream that we save on customer phones which includes the customer account number, how much the customer is supposed to pay per month, where the customer is now only expected to do is to pop up his e-float, click on that short dial. The short dial will ping our network, will trigger the transaction and the customer will simply have to confirm by using his password. So we have reduced the payment from seven steps onto one step and this is actually leaving a greater share of adoption within our customer base.

Secondly, since we recognize not all of our customers are the same and the insights we've been gathering, customers are also craving for speaking with someone when they make payment because they want to make sure they know where they can keep accountable if their money go missing. So we developed a solution, a first solution whereby customers are able to pay over the phone via customer service. We now have a front-end system whereby our agent is able to put the phone number of the customer, the teleco the customer is paying for, the reference number of the customer and the amount of money the customer is willing to pay for us to trigger the transaction and for the transaction to pop up on the customer's phone and once again to keep control in the customer's hands. The customer simply has to put in his pin to confirm the transaction for us to be able to deduct the payment from his e-float.

All of this has been leaping our progress ahead with respect to both repayment and customer's use of mobile money. And at the moment we are standing whereby about 45 percent of all payments are coming from our customer's own wallet. When we originally started, this figure was around 20 percent. Currently we have 55 of all payments coming through the two solutions I've just described to you and these two solutions haven't been deployed for even one year. So in less than one year, we've been able to get 55 percent of our almost 30,000 customers to use these two solutions.

And secondly, which is very interesting from a business standpoint, those customers using the solutions because these solutions are much easier to use than having to trade through the more complex menu, than having to rely on someone else to make a payment for you, we're seeing that those customers

using the solutions are 40 percent less likely to churn. By churn I mean not making payments for an extended period of time than the customers who are paying by other means. And these are customers that normally rely on agents that they need to make payments for them which we see increased the reliance of the customer on a third party, which increased the dependence the customer has in making payments and as such more vulnerability in the customer's ability to be making these payments.

We are very grateful for the support receiving from both CGAP and USAID in the past to really focus on those initiatives and we believe we are on the right path towards the tackle these challenges around agent presence and agent ability which is our next phase of focus. Thank you very much. I'm sure you guys will be having some questions so here for you.

Jem

Thank you, Simone. That's—thank you for that really insightful presentation and to Amy and Craig also for presenting their rapid assessment framework. We have about 30 minutes for questions and answers. And I just want to take the liberty of maybe getting us started with a few questions that I'll direct to our guests and then we'll open it up, I'll hand it back over to the Solutions Center to manage questions and answers from all of you who have dialed in. I just wanted to get started perhaps with a question for Amy and Craig. I mean your presentation was rich in terms of all the work that you've put into this new framework.

I was wondering if you could say a little bit more about I mean clearly this is a very powerful piece of market intelligence or tool that has a lot of market intelligence within it. Who did you have in mind in developing them? I mean clearly this has a lot of utility for PAYGo companies. Can you say a little bit more about kind of your target audience, who you imagined using this tool and in what ways? Try to pick off as many as you can. Can you—and then kind of can you say a little bit about very much dependent on the reliability and the quality of data that underpins it? Can you say a little bit about where you see data getting, the need to invest in better data to make the tool [Break in Audio] do exist? And then thirdly, can you kind of say a little bit more about what your planned tool, is this going to be a little bit more about what you envision this tool will look like?

Amy

With additional thoughts. So the first one was really about audience for the tool. And we are kind of unique in our role here in terms of providing technical support within the center. So for—there were sort of immediate and more longer-term audiences. I think in the short term it was sort of useful to an internal audience to start to look at if we were to invest in new places or want to look at new markets what makes sense in terms of our own internal work. But secondly because the information could be valuable to lots of different audiences I think we really did want to make it something that people could use for a variety of purposes whether that's a company that's interesting in exploring the market and maybe doesn't have the capacity to do formal market intelligence or fund that themselves that they could look at something like this, whether it's someone on the policy maker side wanting to take this to try to make more of an advocacy case about building up agent

networks or looking at some of the other barriers to why one indicator or the other is much lower than other countries it might play that role as well. It's relatively new and I think we're just excited to see where it goes. But that was sort of the background and the development of the tool. Anything else you want to add there, Craig?

Craig

I think you've covered all of it.

Amy

Ok. So I guess with respect to the utility of the tool I think you really did hit it on the nose there that it really depends on the quality of the data. And so, one of the things that we tried to do is emphasize—and you'll see if you look at the framework that's online is look at the data sources that we could find and sort of evaluate them with some of the advantages of what they show and what they don't. And I think one overarching—maybe it's not a gap but just a weakness is precisely this difference between what we can get in sort of aggregated data sets and what people actually with their hands on the ground particularly with the affordability and the doing business indicators.

They're very high level. They only measure one particular aspect of something and so it's—with the doing business index there's a measure on access to credit but that looks at sort of deductive information available and doesn't really tell you anything about the experience of a small company and how easy or hard or what interest rate they're going to pay or that sort of thing. So I think having ways to sort of tie these high-level indicators to some on the ground experience is one place to maybe strengthen this whether that's getting feedback from providers or just making more data sets available that you can kind of check those. I think that's one.

Craig

I think on a similar note to that sort of on the ground economic or business data, when we—for example when we were measuring electricity access it was based on one question on a survey where people were asked do you have electricity. Whether people have electricity or not is actually a lot more complicated than that in terms of how much they're paying for it, how reliable it is, how often they have to deal with blackouts and that sort of thing. And so, more nuanced data about both the quality of electricity service that people are getting and also the quality of mobile service that people are getting would be really useful. Again, we know about the number of mobile subscriptions in a country. We know about how many people are reporting that they have a mobile phone. What we know a lot less about is things like connection speed and quality of service.

Jem

Sorry to interrupt, Craig. But I think if you haven't already—I mean I think there's some interesting opportunities for linking this up with some geospatial work the likes of WRI and others are doing in terms of mapping the socioeconomic activities of rural populations across countries and then overlaying that with energy access. So I think to your point there's a lot of potential here to link up with other similar initiatives that could only enrich the underlying data.

Amy

Yeah. And then in terms of updating the tool, we really wanted this to be something that people could take and sort of use the parts of it that were

relevant to them. So I think within the framework is really just walking through the questions and directing people to data sources. We have applied it in ways to sort of test it out. And if people are interested in that we can share that. But most of I think the immediate use of this is really to try to make these data sources more available, to try to pull information together in a way that makes sense for pay as you go solar companies and hoping that as these data sources are updated people can go back to them and make use of the more current data.

Jem

Ok. That's really helpful. Again, a really rich tool that we look forward to interacting more with. I wanted to kind of turn over to Daniel and ask you a question. You touched on kind of this issue around financial inclusion and this trend that we're seeing whereby PAYGo companies are increasingly kind of evolving towards operating as nonbanking financial institutions. And I was wondering in your opinion—I know it's kind of hard to generalize. But generally speaking do you think the PAYGo companies that are beginning to kind of operate more as a financial institution are equipped to do so.

And what I'm thinking about is in terms of their own capabilities to assess risk internally. And what kind of parallels, what lessons can we learn from the Latin American experience where companies that were focused on product design and delivery and service kind of did kind of go down, the durable goods, retail kind of example in Latin America. Just wanted to see if you could kind of expand on that and drill down a little bit more.

Daniel

Yeah. It's a really good question and actually CGAP is working on a paper with IFC which will hopefully get into kind of exactly these questions. In answer to your question and Simone may disagree with me. But most of these companies as far as I'm aware of their origin stories sort of came into being to solve energy access problems. And became—and are becoming financial institutions. Maybe not by accident. I think all of them had some intention to do this but the depth and degree to which they're providing financial services may have surprised even them. And there are a lot of issues in doing so that I think that—the successful there will determine the success of the model overall and determine which companies really come out on top.

So one of the things I touched on my presentation was the unique nature of the loans. This raises real issues for talking about liability management. So how are you raising capital for a 12-month loan that gets paid off in 14 months? How are you raising capital for a three-year loan? I mean that's just generally a product you don't see in the market. And so, structuring your loan so that you can then raise the funds necessary to the working capital has been a real issue for some companies. Underwriting continues to be a particular issue just given the nature of the client as I think we've already discussed. And then assessing portfolio health and really monitoring that and being able to present it in a way that investors can understand, these are all real challenges.

And global _____ and the World Bank have some early work to try and come up with a standardized set of metrics so that investors can understand the space better but also so that pay as you go providers can really understand

the quality of their portfolio a little bit better. That being said, yeah, the companies are really bringing in top data scientists and I think are getting much, much stronger at evaluating the health of their own portfolios and predicting the repayment capacity for borrowers on future loans. So I think in that way actually the NFIs and in other banks in African could even learn a lot from PAYGo providers, how they evaluate their own customers.

To the question about the Latin American retail example, there's a lot of potential areas to learn. There's some differences, right? So a retail store in Latin America has a lot of foot traffic and it's easy to drive sales. It's easy to drive the bank side of the business. But in the same way you have a captive financial institution. And there we've seen those banks have now offer everything, motorcycle loans, mortgages, savings products, insurance products. How—that did not come about quickly. That took years of lobbying to acquire a banking license and any central bank and any national government is going to be very skeptical of this model initially just due to the flexible nature of the loans, the difficulty in assessing it. And it's just the—you can justify reservations we have around consumer financing more generally.

And so, the question is how much will pay as you go providers need to adapt versus how much central banks will be able to adapt. Or do we not go down that route at all and it eventually becomes are you able to finance this exclusively using commercial debt from local banks where we see partnerships, where we see MFIs that start building out their own distribution arms as we started to see with _____ and with _____ Cred. That's a more long-term question and I'm really excited to see how it turns out and see how these MFIs that are getting into the space fair because I think that might answer your question in an interesting way.

Jem

That's a really good point. In the interest of time I'm going to kind of turn over to Simone and ask—Simone, you kind of—it was really interesting to hear about—I don't know if pilot is the right word but the kind of experimenting with new innovations around how to get users or to kind of create a more user friendly mobile money experience or interface. You mentioned kind of three tactics or strategies that resulted in some significant improvements. Wondering if you had a point of view on which of those three tactics perhaps had the highest kind of return on investment if you will or do you even know. Between those three which would you focus or prioritize?

Simone

Brilliant question. We always look at where to focus our efforts and energies as there are many things we could do. And we need to make sure we are focusing on what would give us the greatest payback. We believe that making payments as simple as possible for customers has been really the golden nugget that we've been able to discover. So if whichever PAYGo company is working in an environment which is not the unicorn of east Africa. If they are to look into what solution, what innovation can they be good together to simplify the payment process for the customers as these are really what we've seen to be the quickest win and what really empowers customers to really believe that technology and innovations always support them. Otherwise the

perception of it is always that these guys are the hand holders for people to go and collect money from them and all of that. So definitely the USSD with the dedicated one time click payment has been so far the greatest success with the highest return on investment we put into it.

Jem

Ok. That's really interesting. I mean it's just very interesting that you took such a customer centric approach to addressing a problem. And I mean I think the example that you cited around customers wanting, despite having mobile money wanting the ability to pick up a phone and talk to somebody and not trying to shut that down but work with that to create a solution I think is really interesting. And it's certainly something that we've seen in other countries. So I'm sure there's much to be learned from your experience. I think again—I think we have about 15 minutes left. And in the interest of getting all of you to ask questions I'm going to now turn it over to the Solutions Center to moderate some additional questions from the audience.

Hostess

All right. Thank you, Jem and thank you to each of the panelists for those outstanding presentations as we shift to the question and answer session. I'd like to remind our attendees to please submit the questions using the question pane at any time. We will also keep several links up on the screen throughout for a quick reference that will point to where you find information about upcoming and previously held webinars and how to take advantage of the Ask an Expert program. We've had some great questions from the audience that we'll be using the remaining time to answer and discuss as Jem stated. The first question for the panelists is can any of you share any experiences with PAYGo solar in rural areas where there is no cell phone coverage?

Daniel

This is Dan Waldron here. I can share. I know that there was some early examples and _____ for pay as you go solar to be topped up with an agent using their smart phone so usually just a plug-in system for uploading credit just for all the sort of existing issues of customer density and how much you're paying the agent to go around making those top ups. But Green Light Planet does have products that can be topped up in that manner. In other places we've seen scratch cards used in lieu of mobile money payments that they just distribute those scratch cards. But we've seen that in India and I think Azori had a product similar to that. I don't know if anyone else has any different recollections.

Hostess

Anyone else? Ok. Well, with that—thank you, Daniel, for answering that. The next question for the panelists are with reports of fraudulent deals in mobile money even in rural areas are you aware of any steps being taken to prevent this or do you have any advice to avoid being taken in by fraudulent vendors?

Simone

Maybe I can take that. We in Ghana haven't really seen a lot of fraudulent vendors as such. You see people who are faking being PEG agents and going to customers asking them to make payments through the agents. And that's why we always educate customers at point of sale. We would never send an agent to go and pick up money from them. They always have to make payments using mobile money through a branded mobile money agent. And after each transaction we are sending them a text message confirming the

transaction ID. So that's what we have been doing to tackle the payment fraud that potentially can come up. _____ anything around products.

Hostess

Ok. Great. Does anyone else want to comment to that? Ok. Very good. Our next question is what have been the most effective methods for addressing extended nonpayment across the sector? Do providers eventually charge late fees or demand return of the systems? And then also if a system fails does, do you pay a penalty to the client? How do you deal with that situation?

Simone

Let me share my experience. What we do is for customers are not paying and normally they don't pay because of having some financial issues we simply ask them if they are going to be able to make payments. If they return the asset back to us, we would give them back the deposit. So in this case the customer is getting back some of what he has paid to us and if he's having financial problems that would be a good breath of air. And we would be getting back our solar home system which would be used as a swap for any other customer who is having a system which is malfunctioning. And of course, each system we retrieve goes through a quality assurance check. So that's what we've been doing to get customers who are not paying to return the device. There are definitely a lot of different strategies that can be used. And that really much depends on what is the intent of the company with respect to are they looking at getting as many of the customers to pay back as soon as possible or they are not really looking to a time for repayment. As long as the customer has the device, they expect them to be paying at some point and a such are going to push for the repossession.

Daniel

Yeah. I'll just second that. I think with the energy service companies so BBOX and previously off grid electric they were really able—and BBOX still is really able to repossess and refurbish and redeploy quite quickly but that's because they own the asset and that needs to be a revenue producing asset for them. With the more consumer finance models, yeah, Simone I think summed it up quite well and that's broadly I think what we see elsewhere which is not a huge emphasis on repossessions but working with the customer and seeing if they can get the unit back and give them their deposit.

Hostess

Ok. Thank you. Our next question from the audience is what are we learning about product quality and durability? What is being done to insure both reasonable quality and if the units fail for any reason what are the steps to repair that?

Simone

Around product quality what we do, we make sure we're giving customers—the first thing is that we give customers a two-year warranty on the solar home system. And since we sell pretty close to our service centers, customers can come back and receive assistance if the device is not working as expected. We normally are able to resolve issues as well remotely even that the solar system is giving us some code and each code equates to a trouble shooting procedure. But if the customer is not able to fix it by himself it's always we'll come back to our service center for us to support them. And honestly, we've had many issues with defect rate or anything like that that is comparing the goodwill on the customer against our product. And that's especially important because being a product customers pay over time, if

they're not happy with the quality he will not be making the payments for us that expect them to pay which would be detrimental for them and for us. So plus customer experience is really at the forefront.

Daniel

Yeah. And just I'll second that having seen Simone's teams in action. They do a great job of addressing any technical issues because it's so crucial to the portfolio. And the question of quality assurance, I mean Lighting Global is really doing the bulk of the work there in certifying these off-grid products and trying to improve the market quality because yeah, for so many years the market—and still its flooded with cheap products that will break quickly and will reliably not work. So I think we're getting better and I think most of the providers recognize that the service is king so it's a crucial issue.

Hostess

Ok. Very good. Thank you both for answering that. Our next question is what are the steps required in setting up a mobile money PAYGo infrastructure? How long does it take and what are the challenges that you face?

Simone

It took over one year to get the ability of registering customers through all of the four telcos remotely. The main challenge was about being able to receive from the customer his ID for us to process it. Now we've been able to set up a process and we have relationships with the telcos which have enabled us to perform this. So honestly, there are no big challenges and that's the first pillar with respect to showing our customers are able to pay using mobile money. Previously the big challenge we were facing was agents were charging customers to get registered for money and of course many customers were not happy about having to pay additional fees to get mobile money because that was the only way of paying us. So now having overcome the challenge, there are no other hard but the registration. There are bunch of other ones but not specifically this.

Hostess

Wonderful. Thank you. Our next question is asking can you talk about the underwriting process and criteria? Is it decentralized or centralized and what kind of info do you collect during that process?

Simone

We collect from customers a variety of information. We do have a gateway score card which allows us to understand the propensity of the thought of a customer. This has been developed through our years of operations by capturing demographic data from customers and understanding what is their profession, seeing how many kids they have an all that. So this is done remotely and we have a validation done at the call center at the point of activation since every device gets activated only after our head office speaks with the customer and takes him through some sort of quiz in a way to insure the information we have our correct, validate the output from our score card.

Hostess

Great. Thank you again to each of the panelists for the informative question and answer session. For any questions that we didn't have time to get to, we'll connect with those attendees offline after the webinar. On behalf of the Clean Energy Solutions Center I'd like to extend a thank you to all of our expert panelists and our attendees for participating in today's webinar. We very much appreciate your time and hope in return there are some valuable insights that you can take back to your ministries, departments or

organizations. We also invite you to inform your colleagues and those in your networks about the Solutions Center resources and services including no cost policy support through our Ask an Expert service. I invite you to check the Solutions Center website if you'd like to view the slides and listen to the recording of today's presentation.

As well as previously held webinars, additionally you'll find information on upcoming webinars and other training events. We are not also posting webinar recordings to the [Clean Energy Solutions Center YouTube channel](#). Please allow one week for the recording to be posted. And finally, I'd like to ask—finally I would like to kindly ask you to take a moment to complete the short survey that will appear when we conclude our webinar. Please enjoy the rest of your day. We hope to see you again at future Clean Energy Solutions Center events. And this concludes our webinar.

DRAFT