CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

Off-grid Renewables: Energy Access and Market Opportunity

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Webinar Panelists

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Stephanie Bechler Hello everyone. I'm Stephanie Bechler with the National Renewable Energy Laboratory. Welcome to today's webinar which is hosted by the Clean Energy Solutions Center in partnership with Renewable Energy Policy Network of the 21st Century. Today's webinar is focused on off-grid renewables, energy access and market opportunity.

One important note of 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 practices resources reviewed and selected by technical experts.

Before we begin, I'll go over some of the webinar's features. For audio, you have two options. You may either listen to your computer of over the telephone. If you listen to the computer, please select the mic and speakers option in the audio pane. If you choose to dial in by phone, please select the telephone option and a box on the right-hand side will display the telephone number and audio PIN you should use to dial in. If anyone is having technical difficulties with the webinar, you may contact the Go-To Webinar's helpdesk at 888-259-3826.

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presentations will be posted to the Solutions Center training page within the next few weeks and it will also be added to the Solutions Center You Tube channel where you can 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, Christine Lins and Kristina Skierka. These panelists have been kind enough to join us to discuss off-grid renewables and their role in increasing energy access. Before our speakers begin their presentations, I'll provide a short overview of the Clean Energy Solutions Center initiatives and then following the presentations we'll have a question and answer session where the panelists will address questions submitted by the audience. This includes closing remarks and a brief survey.

This next slide provides a bit of background in how the Solutions Center came to be. The Solutions Center is one of 13 initiatives of the Clean Energy Ministerial that was launched in April of 2011 and it's primarily led by Australia, the United States and other CEM partners. Outcomes of this unique initiative includes support of developing countries and emerging economies through enhancement of resources on policies relating to energy access, no-cost expert policy assistance, peer-to-peer learning and training tools such as the webinar you are attending today.

The Solutions Center has four primary goals. It serves as a clearing house of clean energy policy resources. It also serves to share policy best practices, data and analysis tools specific to clean energy policies and programs. The Solutions Center delivers dynamic services that enable expert assistance, peer-to-peer sharing of experiences. Then finally, the Center fosters dialogue on emerging policies, issues and innovations around the globe. Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries but we also strive to engage with the private sector, NGOs and civil society.

A large key feature of the Solutions Center that we provide is no-cost expert policy assistance known as Ask-an-Expert. The Ask-an-Expert program has established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries at no cost. For example, in the area of renewable energy action planning we are very pleased to have Bill Becker from the Natural Capitalism Solution serving as one of our experts. If you have a need for policy assistance in renewable energy planning or any other clean energy sector, I encourage you to use this valuable service. Again, the assistance is provided free of charge. If you have any questions for our experts, please submit it through our simple online form at cleanenergysolutions.org/expert. We also invite you to spread the word about this service to those in your network and organization.

Now I'd like to provide brief productions for today's panelists. First up today is Christine Lins. Christine was the main executive secretary of REN21 since July of 2011. I'm sure many of you are familiar with REN21 but for those of you that aren't, it is a global public/private multi-stakeholder network on renewable energy that contains international organizations, governments,

industry associations, science and academia as well as NGOs working in the field of renewable energy.

Following Christine's presentation, we will hear from Kristina Skierka. She is the campaign director for Power for All Campaign and has helped create a movement dedicated to achieving universal energy access by 2025. With expertise in both energy and public awareness campaigns, Kristina has led well-known environmental leadership initiatives in the energy sector for both private companies such as d.light's "Future of Energy" and public organizations such as the State of California's Energy Efficiency Strategic Plan. With those brief introductions, I would like to welcome Christine Lins to the webinar to kick things off. Christine?

Christine Lins

Thank you very much Stephanie. Good morning. Good afternoon, ladies and gentlemen, depending on where you are. It's my great pleasure to be here with you today and to provide you with some insights on REN21's Renewables 2016 Global Status Report with a special focus on off-grid access to energy. Stephanie has already mentioned REN21 is a global stakeholder network with a secretariat based _____ ____ and information's minoring program in Paris, France and we are producing since 2005 an annual overview on market industry policy and investment trends in the field of renewable energy.

Since a couple of years we have upscaled tracking of evolution of distributed renewable energy for energy access and it's a report that covers all renewable energy technologies on all sectors from power heating and cooling and the transport sector. When producing the report, we rely on the robust community of over 700 experts in the field of renewable energy, energy access and energy efficiency. It's a growth that is growing. So should be there. Search the biz among you who are not yet part of the network and would wish to do so please contact us after the webinar.

All the information off the global status report is available from our website, REN21.net. There is also this year we have for the first time introduced a micro site which should also facilitate access to information for people with low internet bandwidth. So to be really sure that access also in remote places is feasible.

So in a nutshell, 2015 was an extraordinary year for renewable energy. There was a record of 147 gigabyte of renewable power capacity added in 2015, which represents the largest annual increase ever. We see that renewable heat has increased by about 38 gigabyte thermal and there was also an increase in the _____ biofuels production.

Here in Europe, we have at the moment the European Football championship but we know that people are not only competitive in football but also when it comes to the key renewable energy champions or markets. When we actually look at annual investment in renewable energy, capacity, additions and production we see that in absolute numbers the champions are China, United States, Japan, United Kingdom and India. However, when you look at investment in renewable power and fuels per unit GDP the list reads quite different with Mauritania, Honduras, Uruguay, Morocco and Jamaica which

already shows that emerging economies in developing countries are the ones invested most in renewable energy. This I think is a very, very positive thing because these are the parts of the world where energy demand is still growing and where countries do not yet have the infrastructure and are not locked in fossil fuels so can effectively leap frog some development and immediately get the energy situation right by investing in renewables in the energy efficiency.

When we look at investment total capacity installations, again, the list is, if I may say, the usual suspects with China, United States, Brazil, Germany, Canada. However, when we look at per capita we see that the list of countries is very European, which all state these are the markets with quite a high penetration of variable renewables.

In terms of policy, we have situation that now 173 countries around the world have renewable energy targets and out of these, 146 have renewable energy support policies. The majority of countries in the power sector falls by 66 countries in the field of transport and 21 countries in the field of heating and cooling. There we see still that there is quite a long way to go.

Electricity continues to dominate policy makers' focus as you can see on the slide. Regulatory policies in the power sector cover over 87 percent of the world population. That's the map on the left. While regulatory policies in the heating and cooling sector have 50 percent. That's the orange map on the bottom. In the transport sector, 73 percent of world population. That's the green map on the right. So a lot's happening in the field of power in the policy area. Not so much yet on heating and cooling and on transport. That's actually also what we see reflected then in market terms.

Where we see it in the power sector, most of the development in the last couple of years were happening, we have a situation that renewable energy now comprises about 29 percent of global power generation capacity and about 24 percent of global electricity demands. Renewables made up for 60 percent of net additions to global power capacity and resented for higher shares of capacity and in several countries around the world. For example, we see that variable renewables are achieving high levels of penetration.

Wind power, for example, is playing a major role in meeting electricity demand and increasing in both countries including Denmark where 42 percent of electricity demand is covered by wind, Uruguay 15.5 percent and we see an estimated 22 countries around the world had enough PV capacity at the end of 2015 to meet more than 1 percent of their electricity demand with far higher shares in some countries. _____ capacity, power capacity also increased of almost nine percent in 2015 compared to previous years.

So when we actually look at most of development happened, clearly the champion areas were wind and solar PV. In solar PV, the market was up 25 percent over 2014 with a record of 50 gigawatts, lifting the global total in solar capacity to 227 gigawatts which you see in a quite exponential rise of the curve. We see that the annual PV market in 2015 was nearly ten times the world's cumulative solar PV capacity a decade earlier. I think one of the

reasons why there was so much success in the PV sector was clearly that in that area you have both largescale installations, centralized capacity additions but you also have quite a lot of decentralized off-grid capacity that was added where the market is growing. I'm going to come to this in another second. But clearly, the relevance for the off-grid market there, your off solar PV is very important.

Total, globally, there are about 8.1 million people directly or indirectly employed in the renewable energy sector with leading employers being China, Brazil, United States and India. In general, we saw an increase of global employment in 2005 by about 5 percent compared to the previous year.

2015 was also a record year for investment. Global investment in renewables was estimated at $286 billion U.S. dollars. That's an increase also five percent compared to 2014. I think what is very interesting for the first time in history, emerging economies of developing countries invested more in renewable country than did the developed countries. So, we see that developing and emerging economies invested $156 billion U.S. dollars, which represents an increase of 19 percent compared to 2014, whereas developed countries invested $130 billion which represents a decrease of 8 percent compared to 2014. This decrease is mainly coming from slowing investments in the European Union.

China played a dominant role, increasing its investment by about 17 percent to $103 billion U.S. dollars which accounts for 36 percent of the global total. Renewable energy investment also increased significantly in other countries such as in India, in South Africa, in Mexico and in Chile. We have also other developing economies investing more than $500 million U.S. dollars in renewables in 2015 and they were mainly Morocco, Uruguay, Philippines, Pakistan and Honduras. I think that is really encouraging because, again, these are the jurisdictions where energy demand is growing and where there is still in some of those the need for creating access to energy and electricity in particular.

When you look at where investment was found, the majority of investment went to the solar power and the wind market. Those were the two areas which continued to grow whereas all the others compared to 2014 actually decreased. Very interesting also that for the first time solar power, the spending or the investment of solar between developed and developing countries was actually at par whereas in the wind sector we already see that there is more investment happening in emerging economies than in developing countries.

So I mentioned we have a dedicated section in the Global Status Report to track information on distributed renewable energy for energy access. We consider this very important because we still have the phenomenon that we have 17 percent of the global population lacking access to electricity which represents about 1.2 billion people and about 38 percent lack access to clean cooking with the vast majority in the Asia/Pacific region and in Sub-Saharan Africa. We see that distributed renewable energy systems continue to play an increasing role in providing energy services to these populations.

By the year's end, by the end of 2015, there were approximately 28 million households worldwide which were using clean cook stoves. We see the advances in technology increased awareness of deforestation and enhanced government support enabled the expansion of distributed renewable energy in both the electricity, the cooking and the heating sector. So there is progress. However, we also know that there is still a long way to go. We also see that there is little quantitative information existing on distributed renewable energy markets but the information that is out there indicates that markets significant and that they are growing.

We have roughly 44 million off-grid pico-scale products being sold globally by mid-2015 which represents an annual market over on $300 million U.S. dollars. According to our information, about 70 countries worldwide either have some off-grid solar PV capacity installed or have programs in place to support off-grid solar PV applications. In addition, several thousand renewable space mini-grids were in operation with primary markets in Bangladesh, in Cambodia, in China, in India, Morocco and Mali. Distributed renewable energy deployment in 2015 was supported by a variety of policy types such as auctions, dedicated electrification targets and initiatives related to clean renewables cooking.

Fiscal and other incentives that focus on specific renewable technologies such as exemptions on when you edit text or in opportunities also were used to support distributed renewable energy deployment. We also see that there are dozens of international lectures including at least 30 programs and approximately 20 global networks that were involved in deploying distributed renewable energy in 2015. Some of them of course around the Sustainable Energy for All Initiative, the _____ network of the U.N. Foundation but also Power for All who is part of today's webinar.

We see that many of these national programs focus specifically on improving energy access on with renewable in Africa and elsewhere. So as you see here on the transparency, we are trying to really track the key markets for different off-grid solutions be it sort of home systems, sort of lighting system, biogas, clean cook stoves. So by no means is our tracking totally complete, but I think it's a good starting point to really quantify the market. I think it's very important also to showcase that there is investment and this investment in this distributed market is growing.

According to Bloomberg New Energy Finance, there were roughly $276 million U.S. dollars invested in off-grid solar companies. Actually providing solar lanterns and solar alarm systems through end of year 2015 which brings the total since 2010 to more than $511 million U.S. dollars. We also see with these figures that there is a steep increase in the speed of investment. We also see that there's an emergence of innovative business models that continue to mature and expand. The total value of a pay as you go companies in 2015 was estimated at about $160 million U.S. dollars and here there are just some of the main companies in this field listed on the transparency.

So in conclusion I would say that overall 2015 was really a very positive year. Especially in the power sector, progress was steep however when we look at

final energy consumption we see renewables as still providing a relatively small share of global planet energy consumption, maybe 19.2 percent. We see that the share of modern renewables is increasing whereas the share of traditional biomass is of course going down.

As I mentioned, 2015 was a year with the largest global capacity additions in the power sector. It was also the second year globally where we saw global carbon emissions associated with energy consumption remaining stable while the global economy grew and that was mainly because of investments in energy efficiency and renewables. However, we also see that we need to put more emphasis on renewables in the heating and cooling as well as the transport sector and also on sector coupling in order to really advance this global energy transition. We need to work harder to build smarter, more flexible systems that accommodate both centralized and decentralized generation and of course focus on providing energy access for all as outlined by Sustainable Energy for All Objective of the U.N. Secretary General is absolutely fundamental because business as usual will not get us there.

We do not have any excuses. The technologies are out there and what is needed are enabling policy frameworks to really make this energy access for all become a reality. I think our next presenter, Kristina, is going to tell us a bit about Power for All's approach on how to implement this goal. With this I would like to thank you very much for your attention.

Stephanie Bechler Thank you so much for the presentation, Christine. That was wonderful. We will now hand things over to Kristina to give us a little bit more information on Power for All.

Kristina Skierka That's great. Thank you so much. I have to apologize in advance as we're having some slight technical difficulties out here in London as we try to communicate here. So I apologize for any of the audio problems that we might be facing here. So please bear with us. In the meantime, let me tell you a little bit about Power for All. Stephanie, can you see my screen okay and hear all right for the time being?

Stephanie Bechler Yes. Sounds and looks great.

Kristina Skierka Okay, great. Well so to begin, Power for All is a global campaign really dedicated to pushing for universal energy access before 2030 by accelerating the deployment of fast, cost-effective, clean distributed renewable energy solutions such as mini grids and rooftop solar. So over the next few minutes, I just want to tell you a little bit about how in our view universal energy access could be achieved in the next ten years while creating a radically different electricity future where there truly is power for all.

A little bit about us to begin. Power for All's original founders included d.light, the Global Off-Grid Lighting Association, Greenlight Planet Off-Grid Electric, Practical Action, the Sierra Club and Solar Aid. It is these founders that really joined together knowing that we could deliver energy to the 1.2 billion suffering from energy poverty before 2030. The idea here is that there

are certain key enablers that can make that possible. That's really how the Power for All approach is designed.

So briefly, we focus on three types of activity; awareness that leads to behavior change that includes providing the proof about the sector, enabling the sector with tools and telling the right kind of stories that really change how the sector is viewed and really gets us at the table as a legitimate form of energy. We also focus on an approach called market activation which is working in countries to engage, enable and develop collective action to help our stakeholders and our businesses work together to create the kind of environment they need to succeed.

Then finally, advocacy. This happens at a global level as well as a national level that really focuses on targeting key decision makers, developing champions and influencing these key large levers that we feel can influence the development of this marketplace.

This is all based in a vision. It's all based in experience and energy. We all know that power's fundamental to human and economic development. It's not exactly that electricity causes well-being but it actually enables people to create opportunities for themselves. It's energy that actually empowers people to join in the kind of activities that can drive development and create freedom including the ability to study and work before, after the sun sets or rises, using cell phones and accessing the Internet.

As we know there's a strong correlation between human well-being and energy. To illustrate the point, it's helpful to look at the human development index plotted against electricity consumption. HDI for those who don't know is a widely used measure of well-being that includes life expectancy, literacy, education and standard of living. If you look at a country's per capita electricity consumption and that same country's human development index score there are some very clear patterns that emerge.

One of these is that a little bit of electricity goes a long way. When annual energy consumption rises from just zero to just a few thousand kilowatt hours per capita, there is an incredible jump in the correlated HDI scores. So the key here is it doesn't take a lot of energy to drive a really big change. It's important to remember that often time it's those first kilowatts that make the biggest difference in well-being. Just as individuals and lives and whole villages change with access to energy, the impacts are also very real in driving economic growth for entire countries.

So there's increases in energy consumptions that are strongly correlated with dramatic increases in the economic output and productivity of countries. In fact, according to a recent study by the World Bank, rural electrification has been shown to increase income by 38 percent per year. So universal energy access is one of the most important goals of the 21st century and it's also important as an enabling factor to help individuals and entire economies lift themselves out of poverty. So it's no wonder that we've had a decade of sustainable energy for all launched and now have SDG7 as a global priority.

But yet even with all these priorities and attention, more than one billion people are still prevented from accessing the productivity, health and opportunity that come from reliable energy. At the same time this is so important, why is it that we've made so little progress? At Power for All, we think it's because we're looking at solving the problem in perhaps the wrong way.

So conventional wisdom put forth by the IEA a few years back says that it will cost $700 billion largely borne by governments and institutions and over 20 years to achieve universal energy access, but these estimates really put the burden of investments on governments and institutional investors and include a significant amount of traditional steel in the ground grid-based energy and would take an entire generation to achieve. In our view, it's just really unacceptable that in this day and age when we can run lives from a small device that fits in our hands that we're having this problem. We feel that there's a lack of urgency. We also think that there's a better and faster path to universal energy access that begins with changing the way we think about creating universal energy access.

Let me explain. To understand, first of all, this $700 billion is roughly the equivalent of the GDP of Saudi Arabia. So when we look at demands, we have to think about how distributed renewable power can accelerate the energy access timeline. So we have to look at the underlying drivers. Aggregate demand numbers mass critical factors that should define the most appropriate supply solutions. So it's essential to examine the true nature of demand for access. Supply has to be aligned with how energy's actually used by those people currently living and working at energy poverty along with their needs and aspirations in order to accurately portray the supply we need to achieve power for all.

So it's important to understand that 85 percent of the energy impoverished live in rural areas. Even with population growth, migration to urban areas are unlikely to change the number of underserved in the rural areas. So people in remote locations have the same desire for the benefits of access to energy that their urban or peri-urban counterparts do but their location means that they have to go to extremes and sometimes self-destructive extremes to get that power. So the current solutions with a lack of supply forces people in remote locations to extremes which include walking hours to centralized battery charging stations, exposing children to fire hazards with candles or kerosene in order to study at night and putting entire families at night with toxic fumes. So these default approaches to satisfy energy demand in rural areas are really a failure. Billions continue to remain without a supply of reliable energy and instead with expensive, dangerous and unsustainable consequences. This problem won't solve itself.

A historic shift happened recently when for the first time in modern history developing countries passed OECD countries in energy use. So we are just beginning to see the implications of this. Over the course of the next 15 years, non-OECD countries will account for 70 percent population growth and 90 percent of growth in energy demand. So it's in countries like India and

continents like Africa that will be driving the demand for future energy. These are countries currently with less infrastructure and home to the majority of those without energy access. Also in many of these very challenging regions to supply energy.

So universal energy access is not just a good intention but it's a global imperative. It's not if but how we create and deliver the 1,000 terawatts of additional generating capacity or more that we need to build. Absolutely we should consider a range of approaches including fossil fuels and centralized power plants to combat energy poverty. So let's just look at those one at a time.

This view of Beijing's skyline reminds us that fossil fuels are responsible for a host of ills in the developing world, including tuberculosis, burns, asthma, lung cancer and premature death. In addition, coal-fired power plants carry environmental costs of substantial greenhouse gas emissions and solid waste such as ash that have been strongly linked to climate change. So we're in a situation where the default approaches aren't actually solving energy access and scaling fossil fuels would actually be a bit of an environmental disaster.

But setting aside the fuel topic in generating power, we also have to look at centralized transmission grids and distribution systems as a way to solve these problems. So centralized generation and transmission grids are great solutions for high-population density, short transmission distance markets. In fact, with a large number of people expected to live in cities by 2030, grids are an essential part of the energy future for high density areas. But the economics don't really work in lower density long distance situations. Grid extensions can cost 10 to $20,000.00 per kilometer and losses can run from 15 to 25 percent. It's just simply not a very cost effective approach.

Just as important as economics is understanding how energy is used in under-electrified areas. So for most of those without energy access life is lived daily. People are paid, often purchase food and cell phone minutes even on a daily basis including fuels like kerosene and [audio skips out] _____. So flexibility is important.

But what happens when consumers who are already paying outrageous sum for these poor solutions are given an alternative that is still flexible but clean, safe and provides a long-term return on investment? Well it's a revolution, a completely revolution in the way that power is generated, used and paid for. The energy impoverished quite simply are tired of waiting for grids long promised that just haven't been coming. They also want control over their energy and are willing to be active participants in creating access for themselves. As a customer who already pays a substantial premium and larger than average share of their total incomes for poor quality solutions, these consumers have already proven in large numbers that they can and will pay market prices for modern power solutions if we can deliver reliable solutions that meet expectations and needs.

So the great news is that without an established method of energy delivery for the majority of the energy impoverished there is a blank slate for how we

develop energy in the developing world. We can reinvent how energy generated, delivered and paid for by more than 1 billion people in the world and as Christine said earlier, this business as usual approach does not have to be accepted. The performance and cost of the fundamental technologies underlying solar power, energy storage and lighting are changing rapidly. This has created the potential for new energy products that are transforming the world energy outlook.

Energy generation is experiencing a revolution. Cost encounter requirements to reach off-grid populations with renewable energy are changing rapidly and prices for whether it's PV or LEDs or energy storage are falling while the battery density is rising and LEDs have incredible improvements in efficiency and lifetime. So together, these economies of scales have enabled the creation of a host of energy products that for as little as a few dollars can provide hours of additional lights per day for years leading to a doubling of study time or productive work hours.

As we've seen, these solutions to address the massive under-electrified population have to be different from what they were for the developed world. Moreover, with the same legacy infrastructure without the same legacy infrastructure to protect and maintain and with cleaner, cheaper technologies available energy delivery can now leapfrog slow, inefficient and expensive centralized systems much as mobile phones leapfrog landmines in the developing world. In fact, the portable solar lighting industry today, just one part of the Power for All campaign, while worth less than $1 billion now is approximately the same size based on penetration rates as the African mobile phone industry was in the 1990s.

In 1998 mobile phone penetration in developing countries was just 1 percent. Today, roughly 85 percent of the population in Sub-Saharan Africa uses mobile phones. In fact, there are over 650 million phone subscriptions in Africa making it the fastest growing region in the world. With the same competitive advantage which includes some low cost hardware, competition and the ability to pay in bite-sized chunks for the kind of energy people want we actually believe that this in fact could be the curve of universal energy access.

So good news in all of this is there's a better way and it's available today. We've reviewed the nature of demand, the quality of the supply and the breadth of opportunities for this market. So it tells us something about the ideal energy access products and services that we need for households and small businesses throughout the developing world. Moreover, the solutions can be high quality, low cost, customizable and adaptable enabling individuals to control their own power supply and their cost. In many ways, we consider this democratized energy. The fantastic truth is that these products exist today as part of a growing and thriving marketplace.

In this slide, you see that if you combine the number of customers from just the founding organizations of Power for All, our sector is already providing energy to more customers than some of the largest electrical utility companies in the world. This growth has been enabled in large part due to the virtue of a

market based approach focused on providing energy consumer energy products that respond to specific needs and desires of these unique customers in the developing world.

So as it turns out, energy access can be achieved in rural areas in the developing world with renewable, distributed, democratized power. It turns out this isn't just the right thing to do but it's a better solution. What's great is that unlike the five to ten-year process for siting and building power plants distributed energy solutions can be delivered in weeks or months, not years. Secondly, by focusing on market based approaches that involve energy consumers as active participants in choosing their own energy costs will actually be shared by the market, not just large institutional investors. So the Power for All theory of change rests on this concept of activating the market and delivering solar power to 1.2 billion people at a fraction of the cost and time as anticipated by the international energy agency in a report issued about five years ago.

So in our view, the Power for All approach which drives distributed renewable energy solutions at a scale and price that the energy impoverished want and can afford can get us there for ten percent of the cost in half the time. So we can deliver universal energy access before 2030. The question is, "What's standing in our way?" Well it's a transformation the way we think about delivering energy and a shift in the acceptance of renewable, distributed power as a legitimate part of the world's global energy supply. This then is a focus of Power for All, by working to unify the voice of the center that is "beyond the grid" to advocate for specific financial and policy enablers, to mobilize the broader sector and de-position business as usual approaches and by proactively positioning renewable decentralized energy as a better, faster path to universal energy access. We all have the role to play.

So it is the decentralized renewables industry with a growing range of products designed for non-grid environments including pay-as-you-go home systems, mini grids, small wind and micro-hydro that immediately are deployable and widely affordable. So the manufacturers and distributors of these products, Power for All calls for a need to ensure quality to build customer trust, make energy access more affordable through innovative financing solutions, collaborate and market building and taking a stand for Power for All. Our sector is just now learning how to really work together around a collective voice and we have to work together now to get the attention of governments, lenders, funders and the general public so we can accelerate the path to universal access. For public sector and governments, both global and national, it's important to collaborate with the private sector to level the playing field with policies that facilitate the market and don't punish renewables and finally, to include decentralized renewables in energy policy.

Next, we also are supporting foundations and donors to give in a particular way to fund market building and to not give away free products except for disaster relief and supporting market-building initiatives, to grow awareness. This includes government and influencers as well as consumers, the entire

value chain related to this sector. And to have a sustained commitment to the sector. To be prepared to make longer term commitments, perhaps as many as five to seven years and to be prepared to adapt funding as needed to best serve this quickly evolving marketplace. For investors and lenders, all sources of capital, we urge financing, financing for manufacturing, for distribution, for consumer payments and to continue to evaluation ROIs with social impact metrics so that we know that we're making a difference.

Lastly, for energy customers all around the world including many of us on the phone today from the developed world it's essential that we continue to do our part to build then market for decentralized renewables. We have to teach renewables. We have to choose distributed energy when we can and we have to support democratized power. Modern energy technology offers the possibility of a dramatically different electricity future, a democratic and participatory system with homes and businesses around the world becoming energy producers as well as consumers and architects of an entirely new electricity system, all actions and investments that expend the global application of renewable, distributed and democratized energy sources. This includes net zero energy buildings to affordable solar lanterns. All of this together grow legitimacy for the kind of solutions that will deliver universal energy access to the energy impoverished and a more democratic future of energy.

So in closing, the partners of Power for All are united in the belief that we can deliver energy to more than 1 billion people suffering from energy poverty before 2030 with some key enablers in place. You can learn more about our plans and actions and about joining the campaign by visiting powerforall.org. But on a closing note, it's critical that we [audio skips out]—we call that $700 billion mindset that has excused the slow pace of change and settled for a 20-year timeline to deliver access.

Stephanie Bechler Kristina, if you wouldn't—I'm so sorry to interrupt. Would you mind repeating that? you cut out right after the word critical for a little bit. Would you mind just repeating that last part?

Kristina Skierka Oh isn't that perfect? Sure.

Stephanie Bechler I thought it might be perfect.

Kristina Skierka No problem, no problem. Yeah, I was just saying that we all have a role to play and we ask you to work with us to challenge the $700 billion mindset and no longer excuse the slow pace of change and settle for a 20-year timeline to deliver universal energy access. We really want the entire world to work with us to drive acceptance of renewable distributed power as a legitimate part of the world's global energy supply and transform the way the world thinks about delivering energy. This will help us truly achieve power for all.

Stephanie Bechler Excellent. Thank you so much for that presentation Kristina. That was great. We have a couple of questions that have come in from the audience if you guys like—I'd like to address of right now. If anyone listening has something

they would like to ask either of our panelists, please type that into the question pane. Our first question is asking for a little bit more information on sustainable financial models and maybe a little bit of advice on where they can look to find financing for the text that you had mentioned Kristina. Could you provide a little bit more information?

Kristina Skierka I'm sorry. Could you restate the question? I didn't hear it in entirety.

Stephanie Bechler No problem. Someone is just asking for a little bit more information on sustainable financial models for the Power for All plans and just distributed energy generation and also if there's any advice on where they can look to help them find funding for these projects.

Kristina Skierka Okay, so I believe it's asking for questions about financial models.

Stephanie Bechler Yes.

Kristina Skierka I'm sorry. I'm immediately right now having some trouble hearing everything you're saying.

Stephanie Bechler Perfect.

Kristina Skierka Yeah. So I think there's a couple of questions there. Christine may also have an opinion on this since she's had a look at different policies and approaches. But I believe the question is about essentially types of funding and business models that are successful. I think that there's a host of them sort of across the spectrum. A really good immediate source for that would be going onto our website and looking on our blog because that's where we have a list of various spotlights on different companies and the way they do businesses and what's been successful. You can find that on powerforall.org/blog.

In terms of where to go for resources, I think it really sort of depends on what one is looking for because there's a range of needs, financial needs for this sector which we've actually written about in our latest point of view paper which is called "Decentralized Renewables; the Fast Track to Universal Energy Access," which is also on our website. So there's needs for equity. There's need for debt. There's need for high-risk grant capital, et cetera. So outlined that in our power of view paper on page 12 exactly. Then in terms of additional resources, there's a whole host of options with each of those kinds of money. So I'd be happy to take a follow-up email and provide more detailed information if someone was clear on sort of what kind of money they were looking for.

Stephanie Bechler Thank you so much. Christine, do you have anything, any other thoughts on financing options?

Christine Lins Yeah. I mean I will invite people to consult UNEP's global trends in renewable energy finance which _____ to a global status report which provides some insights to the different sources where funding is coming from. There the people should find some further looking information.

Stephanie Bechler Excellent. Thank you very much. A next question that's come in is asking if Power for All—they're asking about specifically Columbia. But can you give an example of just where in the world, what regions have you focused on, which have been the most successful for you in Power for All.

Kristina Skierka Oh sure. Yeah. This falls under what we call the market activation approach of the campaign. So working at a national level. In particular, so we're funded first of all by the U.K. aid agency DFID for a majority of our work as well as some funding for climate works in India. In particular, I think I would draw attention to Africa and the incredible work that's happened in our four focus countries: Rwanda, Sierra Leone, Nigeria and Zimbabwe. In particular, Sierra Leone is an incredible success story in terms of working side by side with the Energy Africa campaign and Power Africa to create a really effective compact process with the government and then developing that sort of market activation approach in Sierra Leone to quickly form a renewable energy association to take efforts to attract companies and to also shine a light on the financing opportunities there.

Literally, within the course of six weeks in this example the government recognized—gave a clear market signal that this was going to be the first Power for All country, that everybody was going to have power by 2025 and that they would be working on creating the right kind of environment to make it easy to do business there. Within literally weeks, we had a flood of company interest and to have commitments that will help the government achieve their first milestone which will be I believe it's 50,000 connections by the end of the year in route to their annual targets to achieve power for all by 2025.

Stephanie Bechler Great. Thank you so much. Our next question is asking about sort of the other end of the financing spectrum we haven't addressed. How can investors access these opportunities?

Kristina Skierka Christine, do you want to take a shot at that and then I can add any additional color if needed?

Christine Lins I'm happy to do so. We have the opinion that the creation of stable policy frameworks in countries is the most important because then we released our—when we see that there is stability in the policy framework we see that investors are really moving into these areas and into these countries and into these markets. So as Kristina has showed in her presentation it cannot only be done by public money to close this energy access gap. So what we do in our work, we focus on working with governments to make sure that these policy frameworks are in place. It's not only us.

Of course there's other agencies such as IRINA and the World Bank and the regional Development banks. We are working closely together with all of them. Then the second pillar, what is important for us is we are trying to gather data and consolidate them to show to the political decision makers that there is actually an interesting market out there that has quite the volume. I mentioned the $276 million U.S. dollars which is exponentially growing. I think because otherwise it's the chicken and the egg.

If you don't have the information, policymakers are not aware that it will create the frameworks that's difficult for investors. So we are really trying to take the issue from a more systemic perspective. I think that there is lots of information out there. We are trying in the Global Status Report to provide an overview of initiatives and I guess this repository of information could be a first step to investors to identify the players and the areas in the markets where policy frameworks are set and where potentially interesting business opportunities lie for them.

Kristina Skierka Yeah, and I guess I would just add—I think that's a great response and if I could build on Christine's comments. There's a ton of information. This is definitely a hot market and a great investment opportunity. I think there's a couple of different resources that are very helpful in this space including GOGLA, the Global Off-Grid Lighting Association's investor conferences including one coming up in November in Nairobi which can be a great resource of information. I also think that it's important—and just to be clear, GOGLA's one of the founding partners of Power for All—and further to add to that though, I think there are a number of things that investors should for sure be keeping an eye on when they do learn about these opportunities and really focusing on companies with a commitment to meeting quality standards set out by lighting global because that's really critical to help the market develop well and not poison the sort of opportunities with sub-standard products that don't last or performance expected.

Stephanie Bechler Great. Thank you both so much for that. We only have one question left to get to. So if there's anything else that the attendees would like to ask, please type it in now. The last question is, "Can you list any of the main problems or roadblocks that you've faced when working with people for the purposes of the Power for All campaign?"

Kristina Skierka That's an interesting question in terms of what kind of people. I'm going to interpret that as what are the challenges, for example, at our main goal which is changing the perception of the way that energy—that this sector's energy delivery is perceived. I think from the Power for All perspective, it's just getting a seat at the table and having the opportunity to have those face to face interactions with policy makers. To be honest, I mean how does policy happen? It's not pretty.

It's oftentimes getting up at 8:00 in the morning and showing up at an energy minister's office somewhere on the continent and trying to introduce this sector and explaining how we can be part of an aggregated solution that can quickly drive universal energy access. I find that once we actually get that opportunity, whether it's through sheer doggedness or additional help from other friends and other governments in Africa, for example, it's an easy sell. Once people can understand and actually see the numbers and get that there's a way to provide energy that is both aspirational for energy consumers and inspirational for entire populations through this sort of call to action of Power for All, it really makes a big difference. But I think getting that information in the hands of people as Christine said is really critical for that clear market signal.

Stephanie Bechler Great. Thank you so much. We have just a couple of follow-up questions. Just for clarification, Kristina, you mentioned that your website has information on agencies that you work with and other funding resources they might be able to take advantage of on your blog?

Christine Lins Yes.

Kristina Skierka Yeah, I would say—oh sorry. I would say that—oh sorry. Go Christine. Okay. Sorry. Somehow I think we got mixed up there. But on the powerforall.org/blog there is information about different successful businesses and different stories coming from the sector itself. But then in terms of financing resources I think the best thing to do would be to go to—either send an email and ask for information on specific kinds of money that people need. But I think Christine said that she had a great resource on REN21 and also recommended I believe it was a UNEP report.

Christine Lins Yes, exactly. It is the Global Trends in Renewable Investment that is available from the UNEP website but there is also a link to it in the Global Status Report as we take information for investment action from this report. So there the different financing sources are listed and in case the people would like to have ferred information, they can always contact us directly at REN21.net.

Stephanie Bechler Excellent. Well thank you both so much for answering all these questions. Do either of you have any closing thoughts before we continue to the survey?

Christine Lins _____ a lot to the Clean Energy Solutions Center for hosting us again today. Thanks to Kristina from Power for All for joining us. Yeah, good morning, afternoon, evening on behalf of REN21 to you all. Thank you.

Stephanie Bechler Thank you so much.

Kristina Skierka That's great. Yeah, I also second that. Thank you so much for hosting. Thanks everyone for joining. I would just remind us that we all have a role to play whether we're in the developed world or the developing world. At the end of the day, there's a real opportunity to vote with our hearts, minds and pocketbooks to transform the way that we consider energy and the way that we generate, use and pay for that energy. So we invite you to be part of the revolution.

Stephanie Bechler Excellent. Thank you both so much for your time today. Thank you so much for the excellent questions that came in. We now have a few attendee survey questions we would like to ask all of you. The first question will be displayed on the screen in just a minute is, "The webinar content provided me with useful information and insight." Please select your option on the screen. Great. Thank you so much. The next question, "The webinar's presenters were effective." Thank you very much.

The third on the screen, "Overall the webinar met my expectations." Thank you very much. Fourth, "Do you anticipate applying or using the information presented in this webinar directly in your work and/or organization?" Great,

thank you. The final question, "Do you anticipate applying the information presented to develop or revise policies or programs in your country of focus?" Great. Thank you all so much for your participation.

On behalf of the Clean Energy Solutions Center, I'd like to extend a thank you to all of our expert panelists and to the attendees for participating in today's webinar. We've had a great audience and we very much appreciate your time. I invite our attendees to check the Solutions Center website if you would like to view the slide and listen to a recording of today's presentation as well as any previously held webinars. Additionally, you will find information on upcoming webinars and other training events.

We are also posting the webinar recordings to the Clean Energy Solution Center's You Tube channel. Please allow about one week for that to get posted. We also invite you to inform your colleagues and those in your networks about the Solution Center's resources and services including no cost policy support. Have a great rest of your day and we hope to see you again on future Clean Energy Solution Center events. This concludes our webinar.