

Tools and Resources for Scaling-up Mini-/Micro-Grids in Tanzania

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Webinar Panelists

Yasemin Erboy Ruff	United Nations Foundation
Andrew Mnzava	IFC
Sanjoy Sandal	World Resources Institute
Alexander Ochs	SD Strategies

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Katie

Hello everyone, I'm Katie Contos with the Clean Energy Solutions Center. Welcome to today's webinar which is hosted by the Solutions Center in partnership with the United Nations Foundation Energy Access Practitioner Network. Today's webinar is focused on tools and resources for scaling-up mini or micro grids in Tanzania.

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 the telephone. If you chose 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 chose 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.

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you'll find other informative webinars as well as video interviews with thought-leaders on clean energy policy topics.

Finally, one important note of mention before we begin our presentation is 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 Resource 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, Andrew Mnzava, Sanjoy Sanyal, and Alexander Ochs, who have joined us to highlight new tools and resources available to many grid developers in Tanzania. Before we jump into the presentations, I'll provide a quick overview of the Clean Energy Solutions Center and Yasemin Erboy Ruff from the United Nations Foundation will provide a quick overview of the Energy Access Practitioners Network.

Following the panelists' presentations, we'll have a question and answer session where the panelists will address questions submitted by the audience. At the end of the webinar, you'll be automatically prompted to fill out a before survey, as well. Thank you in advance for taking a moment to respond.

This webinar is provided by the Clean Energy Solutions Center which focuses on helping the government policy makers design and adopt policies and programs that support the development of clean energy technologies. This is accomplished through the support 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 co-sponsored 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 policies, programs, and services including; a team of over 60 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 development agencies in regional and global organizations to deliver support, and an online library containing over 5,000 clean energy policy related publications, tools, and videos, and other resources. Our primary audience is made up of energy policymakers and analysts from governments and technical organizations in all countries. We also strive to engage with private sectors, 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 SEforALL, and regional-focused entities such as ECOWAS Center for Renewable Energy and Energy Efficiency.

A marquee feature the Solutions Center provides is no-cost expert policy assistance known as Ask an Expert. The Ask an Expert service matches policymakers with more than 60 global experts selected as authoritative

leaders on specific energy, finance, and policy topics. For example, in the area of mini grid standards, we are very pleased to have Ian Baring-Gould, Wind Technology Deployment Manager serving as one of our experts. If you have a need for policy assistance in mini grid standards or any other clean energy sector, we encourage you to use this valuable service. Again, the assistance is provided free-of-charge. If you have a question 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 networks and organizations.

Today's webinar is co-moderated by Yasemin Erboy Ruff, who is the Senior Officer at the United Nations Foundation Energy and Climate Team. Primarily assisting in coordinating efforts to scale-up energy access in developing countries. Now I'd like to provide a brief introduction for today's panelists.

First up today is Andrew Mnzava, who is an Operations Officer with the IFC base in Dar es Salaam, Tanzania. Andrew is the program manager for Lighting Tanzania and the Tanzania Mini-Grid program under IFC.

Following Andrew we'll hear from Sanjoy Sanyal who is a Senior Associate in clean energy finance at World Resources Institute. Prior to WRI, Sanjoy managed the New Ventures Program that helped environmental enterprises raise capital from impact investors.

Our final speaker today is Alexander Ochs who's the CEO of Berlin-based SD Strategies and Senior Director of Climate and Energy at Worldwatch Institute in Washington, D.C. Alexander currently also acts as the President of the Forum for Atlantic Climate and Energy Talks and is the Senior Fellow at Johns Hopkins University.

With those introductions, I'd like to welcome Yasemin to the webinar. Yasemin?

Yasemin

Hello everyone. Can you see my screen okay?

Katie

Yes, it looks great.

Yasemin

Perfect. Hello again everyone. My name is Yasemin and it is a pleasure to have you on another Practitioner Network webinar. This one will be a little different than what we normally do for our monthly training webinars for which we're very excited. We'll be showcasing two very interesting tools for you that should be of great use to those of you who are interested in or currently-developing mini or micro grids in Tanzania. One of which is still not publicly available, so this will be hopefully the first time that it's being shared on such a platform that we hope that it will be of great use to everybody going forward to everybody. We're very thankful to our colleagues from IFC, WRI, and SD Strategies for being with us today.

I'm sure I don't need to tell anybody who's joining us for this webinar about the importance of energy access. I'm going to quickly skip through to give a

little bit of a background about our Energy Access Practitioner Network which was established by the United Nations Foundation in 2011 to help scale energy access in developing countries. We currently have the largest membership of its kind that spans small to medium enterprises, academia, NGO, civil society, social enterprises, governments, all looking to deliver modern energy services—especially for rural electrification.

You can see how our membership has grown in the past years as well as all the different technologies that our members work with. In this particular webinar, I'll be highlighting a couple of tools of interest to many of these developers in Tanzania. Our members will remember that we actually held a workshop in Tanzania very recently that looked at specifically distributors of distributed energy access solutions, so small solar lantern, solar home systems, things like that. This is sort of looking at the other side of the coin, looking at the larger systems, again in the Tanzanian context. In which we have 225 Practitioner Network members working, so hopefully this will be of good use to quite a number of you.

Once again, this webinar will be the fifth in our country-focused webinar series where we look to look at the state of energy access across the globe. This webinar is also a contribution to the Clean Energy Mini-Grid's Partnership, of which the United Nations Foundation is a Steering Committee member and co-Secretariat. Please feel free to follow live Tweets via @energyaccessPN as well as @minigridsHIO and please join the conversation using the #PNwebinar.

Very quickly before our panelists start talking about their specific tools, I just wanted to touch on the fact that Tanzania is considered a large gap country by Sustainable Energy For All, which is among the 20 countries with the lowest electrification rates. Here we can see how that electrification rate plays in between the rural and urban population with about 4 percent of the rural population currently being considered to have energy access. That being said, Tanzania is actually one of the countries that has a really good score on RISE, Regulatory Indicators for Sustainable Energy by the World Bank. You will see that it has an overall score of 75 for energy access out of 100, which is really great in terms of the existence of an electrification plan, consumer affordability of electricity, especially the framework for mini-grids all have really high scores. Obviously Tanzania is doing something right and we will be delving a bit more into that through the specific tools that we will be discussing.

With that, here's how you can reach out to us if you're not a member already. I will turn it over to Andrew to talk about IFC's Mini-Grid Portal. Thank you very much.

Katie

Andrew? Oh, it looks like you un-muted your mic. Can you hear us?

Andrew

Yes, I can hear you. Thank you _____ and thank you Yasemin. Good morning, good afternoon, good evening all. I'm going to present to you very briefly about the Tanzanian Mini-Grid Program.

Katie Andrew? I'm really sorry to interrupt. You're on presenter mode in your screen right now, can you put it on presentation mode?

Andrew You can see my screen? Can you see my screen?

Katie Now we can. So if you're on two monitors, you'll need to select the other monitor.

Andrew Can you see now?

Katie We can see your screen, it's still in presenter mode. Andrew, if you could please go to the sharing app on your screen where the pause button is, if you could please go to that and select "monitor two." There should be a drop-down. So we're currently seeing things in presenter view. Are you using two monitors?

Andrew No, I'm using only one monitor.

Katie Okay, it seems you're presenting in presentation view instead of full screen. Are you able to present in full screen?

Andrew This isn't full screen?

Katie That's it, that's perfect right there.

Andrew Okay, thank you. Now you can see it properly?

Katie Yes, it looks wonderful, thank you.

Andrew Apologies for that. So, briefly I'm going to present about the Mini-Grids Program in Tanzania. Very briefly for those who are not very much aware about IFC, IFC is part of the World Bank Group. IFC's main purpose is to promote and support private sector to help generate productive jobs in deliver essential services. Basically, it's to catalyze and mobilize other sources of financing for private sector development.

Why Mini-Grids in Tanzania? Basically, Tanzania compared to other countries is facing a very big challenge in terms of financial limitations to extend the grid. There are several parts of the country with very large population which have no access to electricity and the government and the other players including development partners for the past several years have tried to support mini-grid penetration in the country and the off-grid sector in general. As the result, the country, under the mini—[cannot understand]—environment which support the development of mini-grids in the country. So the question is how do we keep supporting and help companies and private sector to effectively capture the mini-grid opportunity in the country.

That's where IFC comes in with working on the Tanzanian Mini-Grid Program with the main objective to develop distributed power generation sector in the country, specifically the mini-grid in partnership with scaling up renewable energy programs in Tanzania. Allow me to spend just a few

minutes on this current slide just to share with you the key components of the Mini-Grid Program in Tanzania.

The Mini-Grid Program has two major components. One, we call it Market Development which is all about stirring up the market, making a conducive environment for investors and mini-grid developers to be able to invest in the country. One of the sub-components of this main component is the development of technical standards and specifications. These were key and plays a very important part on the development of mini-grids in Tanzania because for mini-grid developers in the country. If you want to build your mini-grid in the rural and remote areas and you expect in the future the main grid to arrive in the place where you invest your mini-grid, the only way is to build according to the existing grid code—which is the main grid—which is extremely expensive for you to realize your return on investment during the time that you're off-grid since originally you did not plan for main grid connection.

On the other side, there are several mini-grid, micro-grid developers who have been just building these mini-grids or micro-grid project without any specific kind of standards and put them at risk when the main grid shows up. So, they build to develop a minimum kind of technical standard in specifications which will give room in terms of small upgrade when the grid arrives. At the same time, you may be able to connect to the main grid. We work very closely with the government working group which comprises of rural, the regulator, _____ agency, the ministry, national environmental counsel together with rural agency in Tanzania Bureau of Standards to develop these standards. Now, they are on the final stages to be adopted at the national standards and the good news recently they're been referenced by _____ new rules which will be published soon called SPP Electricity Rules for 2017. They've referenced this technical standard and specifications as the minimum required standards for the mini-grids in the country.

Another component is the support of financial institution to help them identify, analyze, and finance mini-grids projects. Another component is the development of information portal for permitting and licensing. I'll explain that more in detail because that's the main point I would like to share with you and show you today how we've developed and how to use it.

But another major component, apart from Market Development is Support to Developers. This is all about transaction advisory services. This addresses the market barrier to mobilize the resources and investments. To help mitigate projects to help investors commercialize and scale-up mini-grids in Tanzania. The support involves technical assessment of design, capacity building, and foundation legal as well as compliance and access registration permits, licensing, and so-forth.

Allow me to quickly take you to the Mini-Grid Portal which is the tool for permitting and licensing. That's the whole purpose. We developed this Mini-Grid Information Portal so anybody who's interested to invest or develop mini-grids in Tanzania can go to this site which is www.minigrids.go.tz and be able to see all the requirements. So, if you'd allow me, I'll remove this

main screen right now and launch the Internet Explorer which was already prepared so that I may try to show you a live-how to of it. Can you see it well right there?

Katie We can still see your presentation currently, Andrew.

Andrew Okay.

Katie And now we can see the Internet Explorer.

Andrew Okay, now you can see the Portal?

Katie Yeah, we can see the webpage now.

Andrew Okay, thank you so much. So, when you type on your browser "minigrids.go.tz" the homepage will appear like what you see right now on your screen. Then, when you scroll down you'll find the list at the bottom of the agencies which we call them the "working groups" comprising of these representatives who are part and parcel of developing this Mini-Grid Portal. Also, they're part and parcel of the entire implementation of the entire Mini-Grid Program in Tanzania in partnership with IFC.

At the page when you click "licensing" section, you'll receive this screen which you might see in a few seconds right in front of you. This screen gives you the options to enter the capacity of your mini-grid. If it's below one megawatt, or it's between one and ten megawatts, or there's no generation it's just distribution. The moment you make this selections, it automatically gives you the procedure in chronological order what you are required to do in the country. So, it can select the capacity, then you can select the technology, you can select whether it's a hybrid or not, then you can select wholesale selling to DNO, this is the Distributed Network Operator, and you can select if it's not a DNO if you're selling directly electricity to the community surrounding you. You can opt to do both, you have your own customers in your own grid and at the same time you're selling to the DNO. By doing that, the selection you make there, when you scroll down, automatically you get in chronological order all the procedures and requirements you need in the country.

For example, you'll see the generation license, then you'll see distribution license, then you'll see the supply license depending on the selection you did at the top. For example, if I select "No Generation" automatically everything will change. All you'll need is a distribution license and supply license if you're just building a distribution network. But, the moment you chose that you'll also generate, you'll need a generation license. From the generation license, then you can click anything numbered there to get more details. For example, if you click "Environmental Clearance" it will open like that and you can see the details of what is required and the procedures, the registration of the project with NEMC, submission of terms of reference, carrying out the EIA study, submission of the environmental impact statement to NEMC. Each of these, the moment you click it, you get more details and key facts as well as some of the contacts. For example, scoping report, what contact is expecting. You're expected to submit, for example, registration with NEMC.

You can get the template from right there. You can get the forms and all the details in place.

This is on the licensing section. You can scroll down and all the details you can see them there. If you click on "Financing", which is the next tab—currently what we have loaded here is the procedure if you want to access funding which is under the Rural Energy Agency. Currently, it will be the Trip funding which is provided by the World Bank. So the Trip funding, the details will be uploaded soon because it has been recently approved and recently shared by the public. Actually, it was last week the details were shared last week. In a week or so, all the details about financing on how to access funding on Trip program which is \$43 million for entire off-grid but almost \$20 million for the mini-grids. All the information will be under this section.

When you click the library section, you can get all the documents in terms of law, policy, reports, forms and fees, tariffs and financing. Once you click on any of these listed documents, you get the summary of the document and you can go on and download the specific document. We have tried to upload all the key laws, policy reports, forms and fees, tariffs, guidelines and standards. All these documents are here, you can just click here and get the document download. We're waiting next week to get approval from EWURA the new released SPT Rules of 2017 which were approved by the ___ board on the 29th of June. I think by next week, also, there will be online so people can easily access them.

So this is the main purpose of forming this portal, for licensing and permits, policy regulations, and information. On the long run, we plan to get more information from the Rural Energy Agency and decided to put the GIS section which allows me to go straight to one of the site which I opened earlier so that I may save time instead of loading the entire site.

On the GIS section, you can pick the region you want and the village—the district. After picking the district, for example here I picked Lindi region. Then you pick Nachingwea, just for example. The moment you click whether you want to see if the village is electrified or not, automatically you get the list of villages which are electrified under that district. If you click to be electrified via grid, you can get all the villages which will be electrified according to REA plan. Also you can click and see villages which have been set aside by REA that they'll only be electrified by off-grid technology. For example, I'm removing other villages to remove those which have been set aside for off-grid. If you click the pin there, automatically you get details about that region, the village, and the population of that village.

This is very brief, let me take you. There are other options here which you can take for example the existing mini hydros, the potential hydros. The number four is the MV Lines. If you click the 33 kV lines, the 11 kV line, these are currently-existing lines under the main grid. So if you click that, your mark will appear like what you see right there. Or, that blue is what exists right now, the current grid extension in terms of 33 and 11 kV lines. If you click the next one, which is the proposed REA plans for the next five

years, this is the ambitious plan of the government. Of course, now they are going to break it into a number of flows, a number of phases because this might take longer than the ambitious five-year plan.

The next screen I tried to combine all of them so that you may see where the plans are and where the grid is going. Also, the same page you also have the Global Solar Atlas for Tanzania which gives you all these details. I believe you can see—I did not click that section specifically to save time. The moment you click that link you'll be taken to the Global Solar Atlas and you can see the typical electricity output that what you see right now. The number of option on your right-hand side corner and you can download the maps on any area that you need. Also, if we go back on the main page here, there's this section which we call a Transaction Advisory Facility site. This is the site where we work with developers that they can register and ask for specific advising that they need. There are several services offered under this transaction advisory facility including technical and engineering support, business advisory characterizing, legal and compliance advising, training and workshop. So we started to work on this Transaction Advisory at the end of last year, but the entire Mini-Grid Program started in October 2015. We'll continue to work with mini-grid developers in the Transaction Advisory Facility and we'll continue to update the Mini-Grid Portal as well as continue to do several studies on market intelligence studies such as benchmarking. As well as to engage the regulatory bodies, the Nemke and EWURA to continue to support them in terms of review of regulatory and to review regulatory issues, policy, and laws, and regulations. Also, to support them to draft other key components which are key for the development of this sector.

For example, recently we supported Nemke to develop solar checklist which is expected to simplify the entire yearly process. We're going to engage with them to also develop other tools for small hydro, for wind, similar like the one we developed for solar checklist technology. Having said that, let me say thank you for now. I believe if there will be any other questions you can ask and I can try to respond. Thank you very much.

Katie Wonderful, thank you so much, Andrew. Now I'd like to introduce Sanjoy to the presentation. Sanjoy, we can see your screen.

Sanjoy Can you see my screen?

Katie Absolutely, it looks great.

Sanjoy Fantastic. Thank you Andrew. Thank you for inviting us to this webinar. We're very happy to present our mapping tool which should work complementary to some of the resources that Andrew had, for practitioners in particular, to help decide where you want your focus—particular region that you want to focus in.

Our purpose is to create a visualization tool for exploring energy access in Tanzania. What this means is to understand where the off-grid market opportunities are. Which region or district you need to focus on. The way we do this is to really use publicly-available data. Our main sources are the

census of 2012 which gives us an indication of socioeconomic characteristics of the various regions and districts and supplemented with the REA report of 2016, which many of you would be familiar with. Those who are not, let me just add one sentence. What this report did is samples a number of households across the country to understand the extent to which Tanzania has made progress towards its electrification goals. Those results are very interesting. Some of our maps really focus on getting into the details of what the data means for both practitioners and policy makers.

The other data set that we have is, of course, energy infrastructure location. Somewhat similar to what Andrew showed you in terms of transmission lines, but we focus a lot of existing mini-grids. What I will do is take you through a few slides which have the screenshots of actual maps and then I'll flip over demonstrating the maps to you. Then, you'll have access to both the PowerPoint and the map link to play around.

The first one is around existing mini-grids. As many of you know, one of the interesting things about Tanzania is that you actually have more than 100 mini-grids operating in this country. Many of them hydro mini-grids and you will see them in the blue-colored section at the bottoms of the screen which is where the waterfalls exist. Then, solar mini-grids which are in the middle of the screen. Then, you have biomass mini-grids and hybrid mini-grids. The large mini-grids are actually hybrid mini-grids. Of the 100 mini-grids, there are maybe 15 percent of that is directly connected to the TANESCO grid. But the rest supply to isolated communities. On our actual map, one of the things you can do—and I'll demonstrate this to you—is that you can click in the mini-grid and understand a little bit of where it is located, what its capacity is, and of course its generating technology which is solar, or wind, or hydro. You can also recall from the color.

The interesting thing about the 2016 update—we do have some interesting maps that will help people to understand this—is the progress the country has made on electrification. However, in this particular slide, what I'm going to show you is the fact that large parts of the rural electric country are still not electrified. For example, the darkest regions you see on the left side of the map is actually more than 80 percent of rural households which are not electrified. Of course, in areas which are more touristy and commercial, Arusha for example, towards south, those areas the rural electrification rates are much higher, but still even today about 50 percent.

The interesting thing is that where the electrification has progressed from 2012 to 2016. This is very important for practitioners, of course policymakers too, but practitioners particularly because as you know, one of the things that as mini-grid developers are concerned about is—we do not want to locate a mini-grid where the grid arrives very quickly. We have a map which sort of divides the country into four regions depending on where the grid has expanded. Of course, as you can see from the screen, you can click on a region and get some statistics around the population density or the number of people who do not have access in 2016 versus 2012. Remember, of course, that 2016 was a sample data.

One important thing that I would like to point out in the 2016 update is the fact that this extent of electrification which we saw in the previous map has—

[Audio cutting out from 00:38:45 - 00:38:52]

— but solar penetration. Now the _____ are publicly available report does not distinguish between solar mini-grids and solar home systems. I think it will be very safe to assume that most of the solar is actually solar home systems, in particular even the pay-as-you-go systems that have been expanding in the country. The startling statistic is the following which is the bottom of this slide. _____ rural household has access to electricity that 65—6.5 of those households have access to electricity via solar and 35 percent via the TANESCO grid. This flips when you look at the urban area.

I just want to repeat this because I think this is a very key take-away from the 2016 update. The progress of electrification in Tanzania has been significantly because of solar and most likely solar home systems. As mini-grid developers, this has implications for you. One of the implications is the next slide which is when households were asked "Do you get your electricity from kerosene, solar, or grid?" one important fact is that the country which was predominately kerosene—at least the rural population—predominately kerosene 2012, has shifted significantly away from kerosene in 2016. You will see the main areas; Lindi, Tabora, Kigoma, where the movement from kerosene has happened.

Again, I think this is important because as off-grid developers, the tendency has been to market our product and service versus how much households spend on kerosene. That probably will have to be _____ a little bit as consumer behavior seems to be changing. People seem to be—if you're not getting electrically from solar or the grid—the tendency from the data seems to be to get it from rechargeable lights which is probably batteries.

As I said, one of the things that we have tried to look at on our map is on economic buoyancy. In many of these areas—obviously we know these areas are poor and remote—but, there is higher areas of economic buoyancy and less area of economic buoyancy. The thinking behind this process of developing the maps has been that private developers should channel the resources in areas which have high economic buoyancy. Of course, public funds should go to areas which have little or lower economic buoyancy because that's where maximum impact for both types of finance will be felt.

What we have done is, using the census data of three asset classes—which is iron sheet roofing, radio, and livestock. Combined them but not necessarily with equal weights. For example, livestock in our market has a lower rate. To divide the country in this map that you see around economic buoyancy. As you can see, Arusha, for example, pops up as one of the areas that has greater economic buoyancy. It's also an area where, as you know, some of the larger solar home system companies started operations from—which is indubitably the right place to start.

In our actual maps—I'll move over to that in a minute—you can actually spend time drilling down looking at the particular data sets that you are interested in, looking at districts, and looking at where public finance should be focused in, where private finance can go. ____ using the maps. Can you see my maps now?

Katie Yes, we're able to see them.

Sanjoy Fantastic. This first map is really a map of the country in terms of its population density, which is of course important. There is a lot of interesting stuff in the maps. Some of the things I talked about—each of these maps will have to be loaded on their own so it will take a few seconds. For example, now can you see the overall state of electrification in Tanzania. Can you all see the map?

Katie Sanjoy, yes, we can see it. It looks great.

Sanjoy Fantastic. Then you can click on. I'm moving my cursor around that. You can click here for rural electrification rates, which is the map I showed you on my PowerPoint. You can click on the percentage of people using solar. You can click on the percentage of people using grid in each region. I'm not going to show you those maps because, as I said, each of those maps will have to be loaded. But, you saw screenshots of those maps in my PowerPoint.

What you will see next is where the mini-grids are located. Let's wait for it to come up in a second. You should have seen this map in the PowerPoint. For example, now if you click on any of these mini-grids you can look at—for example this particular one is connected to the grid. The hydro mini-grid is in the region of Njombe and even the village is mentioned. Can you see that?

Katie Yes, we're able to see it.

Sanjoy Fantastic. I will skip over the details of electrification gains 2012 to 2016. I would encourage you to sort of play around with it at various point when you have it. Some of the things I discussed—one of the cool things I wanted to show you is around the economic buoyancy. As I said, we have used different weights. So iron sheet roofing and livestock ownership—livestock ownership has a lower weight. But you could, for example, look at—I think this is really an interesting feature which I wanted to end this presentation with. For example, you could say "I am a private sector player, I want to focus my business in one particular—using a set of criteria."

So you click on "regions" and you click on "private sector." You have a lot of explanation on the right. Basically what you do is you click on this filter and say "I want to focus on areas which have higher energy need." So the first two regions where the maximum number of people are not connected to the grid. But, in my business I sell a radio with my system. I think my consumers really like to listen to the radio, so I click on only radio—people who have high radio ownership. You get those regions that fit your specific criteria. What is even more interesting is you could do this at the district level. If I click on district, private sector, I'll get a similar map. Wait for it to come up.

This is the country; this is the district. I said, "Okay, I'm starting up my business. I have my interest to set up five mini-grids" or whatever it is. "But I wanna focus it in area where there is potential to expand in neighboring villages." And I say, "I wanna pick districts which have higher energy need, but only ____ because I think my ____ really wants to listen to radio." Then you get the specific districts that you can focus on within that you can choose contiguous districts to start your business.

So this is our tool. With that, I say thank you.

Katie Wonderful, thank you so much Sanjoy. Now we'd like to welcome Alexander Ochs to the webinar. Wonderful, Alex, we can see your screen.

Alexander All right and you should be able to hear me now as well?

Katie Yes, loud and clear. Wonderful. The floor is yours.

Alexander Okay, great. Thanks much Yasemin. And thanks to Andrew and Sanjoy for great presentations of their really fantastic work. I want to congratulate for your contributions. Great to see.

I only have a few minutes so let's get started right away. I've been asked to introduce to you a new initiative which we are organizing as part of LEDSGP, the Low Emissions Development Strategies Global Partnership. This initiative is called African Mini-Grids Community of Practice. I am the chair of the Energy Working Group of the LEDSGP Global Partnership has designed this initiative in close cooperation with the Africa Platform of the LEDSGP.

For those of you who do not know what the LEDSGP is—I'm trying to change my slide, here we go—this is a quick overview. The LEDSGP is a practitioner's network of now more than 500 governments and international organizations. More than 2,000 individuals have contributed to it in one or the other way. The mission of the LEDSGP really is to harness the collective knowledge and resources of governments, donors, international organizations, and individuals for scaling-up and implementing climate-resilient low-emissions development strategies.

Around the world pretty much. The center of gravity of the LEDSGP Global Partnership is in its regional platforms, which you see on the left-hand screen. Until recently we had three of them; Africa, Asia, and the Caribbean. More recently, we have a new platform that has founded itself so to speak which is the EP platform for Europe and Eurasia.

Groups like mine—the sector groups—but also groups on financing and tools for analysis and subnational integration have the main role of supporting what the main regional platforms are doing, but we're also at points are creating our own more global initiatives. So that's what the LEDSGP is. I wanted to introduce on the next two slides briefly what Community of Practice is or how we have designed and implemented Communities of Practice. The term, of course, is not our invention but I think the specific design is quite special of how we're implementing it under the LEDSGP Global Partnership.

So what is a Community of Practice? It's really a new approach to providing technical assistance to countries that are asking for support—in our case, in the energy sector. A couple of years ago, I was thinking about what we can do to be more serious about making the provision of technical assistance more demand driven; less top-down; less based on writing studies in Washington DC, or in Berlin, or Wales, in another capital of the world; and presenting them then in the field and shaking hands with ministers and leaving the country again. So this is a long-term effort Community of Practice. We came up with this tool and have started to implement it last year in Latin America and the Caribbean with a Community of Practice that is focusing specifically on bioelectricity. Now it has become the center of our work in the Energy Working Group. Most of our time really goes towards working with the regional platforms on these Communities of Practice.

So how do we do this? Basically, we invite governments to join a community of like-minded countries that are all sharing certain goals that are all ambitious in creating an energy system that is affordable, reliable, and sustainable to come together to work on very specific issue area. In fact, the requests for these issue areas themselves come out of the request of countries at regional platform meetings or in the case of Africa and the mini-grids Community of Practice came out of a survey of the members of the Africa Platform. Our role, then, is to support the countries in designing a joined-work program of topics that are of mutual interest and help them move forward towards its implementation. Our role is really rather that of a co-pilot and we're taking this very serious. To give you just one example, at our in-person meetings and the virtual meetings, we're starting with the governments presenting their situation, presenting their key challenges, presenting what ideas they have on making progress. Only then we'll bring in trainers and experts in to support them to achieve that.

So it's quite a special and very time-intensive resource initiative. Not just for us as organizers and supporters, but also for the countries. It's not a one-time gig so to speak where you present what your country is or wants to do, but it is a continuous effort and it requires significant time resources.

I'm gonna flip through these slides very quickly because I know I have very little time. But what is important for members is that they shared a joint goal, comparable demands. That they are willing to help and share their insights and their best and worst practices. At the same time, they are open to be assisted, that they are honest about their challenges. Our meetings are off-the-record and countries are asked to specifically focus on where the challenges, the problems, and the deficiencies lie so that we can attack, address, and tackle those.

For us as organizers, it's important that we create this trust environment, that we employ multiple communication channels as we have done. That we create a conceptual framework that provides some guidance and some concept of moving forward, but is very flexible to address the demands. We then support countries with our own research and drafting capacities. We

bring in trainers like the Clean Energy Solutions Center's experts on the various specific and technical issues.

All right, this is an apology for not having the nice visuals that my predecessors had and presenting such text-driven slides here. This is just very quickly for how the mini-grids Community of Practice in Africa—

Katie Alexander?

Alexander Yes?

Katie So very sorry to interpret. We just need to shortly move on to the question and answer session.

Alexander Okay, do I have a couple of minutes?

Katie Another minute or two if you could wrap it up, we just really need to move on.

Alexander Okay. So I'm gonna flip to my last bullet here. Our goal is really not education in any way, but real policies, regulation, and programs. So this is the time schedule. We're just coming out of an inaugural workshop and this is not becoming a one-year process with two more in-person meetings and the number of work streams that we're going to create under this Community of Practice. These are the broad priority and work areas. I'm not gonna go through these last two slides in detail. Basically, we conceptualized what it is that the 11 members of the Community of Practice from all across Africa—Tanzania being one of them and showing great leadership in it—have defined and we are very much aware of all the other good initiatives that are out there including the host of this session. Basically what we're coming out with from the last meeting is a keen interest to work on business models to work on access to donors and international financing. And that's basically where we are continuing to go in the future. The next workshop in three months is going to be specifically focused on access to financing and business models, what has been working across Africa in the area of mini-grids. I'm looking forward to bringing as many of you into this as our interested. Thank you.

Katie Thank you so much, Alexander. Thank you to each of the panelists for those outstanding presentations. As we shift to the Q&A I would just like to remind our attendees to please submit the questions using the question pane at any time. We also keep up several links up on the screen throughout for quick reference that point you to where you can find information about upcoming and previously-held webinars and how to take advantage of the Ask an Expert program. With that, we'd like to go to our moderated discussion with Yasemin. Yasemin?

Yasemin Thank you so much and thank you to everyone. This was a really great series of presentations of very complementary resources. One on the "how" with all the documents that IFC has put together. One on the "where" with both the maps that WRI is showcasing and also one on the "who" with the Community of Practice. I am just going to take maybe ten or so minutes to ask some

overarching and broader questions that hopefully will also answer some of our audience questions. At any time, we welcome all of you to ask your questions—whether they're specific to each presenter or overall—through the question pane. I just want to remind everybody that we're also live Tweeting the webinar through #PNwebinars. You can also ask questions or join the conversation through there.

So I wanted to start with a question—well, sort of a remark on the fact that while there are many energy access related mapping efforts, these two that we've seen today are obviously very unique contributions. I want to give Sanjoy and Andrew a chance to talk about how each tool complements other tools in this space? What makes them different? What is their value-add for different stakeholders?

[Inaudible due to wind noise 01:01:58 - 01:02:03]

— what other data layers you want to add on and people can look forward to seeing. Sanjoy, maybe we can start with you?

Sanjoy

Thank you. From our perspective, we try to focus on demand—you know, where the demand is—which is why we're looking at socioeconomic characteristics in particular. We believe that this complements well with, for example, the supply side and the solar houses is one example of that. Looking at specific villages within an overall region.

Yasemin

Great. Andrew, did you want to chime in?

Andrew

Thank you so much.

Yasemin

Andrew, we can't really hear you. Please make sure you're talking into your microphone.

Andrew

Can you hear me now?

Katie

No, I'm sorry Andrew, it's still really faint. Can you adjust your microphone?

Andrew

Okay, now?

Katie

It's a little bit better. It's still very faint, though.

Andrew

Strange. Let me speak louder. Briefly, what we are doing basically is the entire approach of looking on the mini-grid space. The first two years were much more on the market development. The next three years—as we have just started the second phase—we're going to look into details to develop more tools that will be used. For example, now we are gathering some information how to do the entire household mapping on the remote areas. But also, at the same time, to do some demand and supply market intelligence studies which will involve different stakeholders. Also, on the other side, to look on how we can support the hybrid systems which exist outside there.

So it's the entire package while we continue to work with the transaction advisor facilitator, will continue to work with mini-grid developers to assist them to develop financial business models. So it's the entire approach of looking at the studies, the tools, but also to support developers to successfully implement mini-grid project that's commercially viable and to scale-up. Thank you.

Yasemin Perfect, thank you both. One other question that I already received via E-Mail from a lot of our members even before the webinar was the question of whether you have any other countries in mind for this kind of mapping. Whether there is a possibility for expansion of either tool or any other countries you're considering doing similar projects for. Again, this goes for both Sanjoy and Andrew. Feel free to answer in any order you like.

Sanjoy Andrew, do you want to go first?

Andrew Okay, yes. In the future there is possibility of going to other countries also. More details will be coming soon. But, yes, in the future, more tools will be developed, other countries also which we are looking at.

Sanjoy Thank you. We have one version of these maps already developed for India. The Tanzania maps, of course, further along in developed. Our plans, like Andrew's, is to go to other countries in particular to other countries in east Africa.

Yasemin Great. Another thing I had in mind is the question we always ask all our panelists on country-related webinars; which is the question of coordination in the policy environment. Obviously we've seen that Tanzania has basically the highest number of mini-grid operators in sub-Saharan Africa and yet still barriers exist. So if you could—maybe all three of you—speak to your thoughts around mini-grid regulation implementation, and what the government might be planning, how to coordinate around that, how to also ensure sustainability as well as commercial viability. From Andrew's presentation, we saw that mini-grids were considered commercially viable only for the high-density populations. Which you can argue might also degrade candidates for grid expansion. So how do we manage that tension and what other barriers might we have to consider or what other solutions might there be in terms of ensuring there is a proper scale-up specifically of mini-grids, but we can also talk about other distributive energy solutions. Andrew, can we start with you since you have a great historical overview of Tanzania?

Andrew Thank you very much Yasemin. In the context of Tanzania, recently the government—

Yasemin Um, Andrew, sorry to interrupt you. Could you speak a little higher and maybe a little slower? I feel like we're losing some of what you're saying.

Andrew Okay. Much better?

Yasemin Yes, thank you.

Andrew Okay, so what I was saying is in Tanzania context, the government have recently been working to improve the regulatory sector. I'm saying this because—for example—last year we'd been working with the regulator to support them and to work with other stakeholders on the process of—[audio cut out]—last month on the 29th of June, the body approved the new rules of 2017. These rules have something very key—[Inaudible.] That address those challenges—[Inaudible.]—they are more viable. Also at the same time attractive [Inaudible.] At the same time these places are very far from the main—[Inaudible.]—maybe they'd be connected by five or ten. The question currently—[Inaudible]

Yasemin Andrew, we're unfortunately unable to hear you again.

Katie Yeah, Andrew this is—go ahead Yasemin, I'm sorry.

Yasemin No sorry. I just wanted to say Andrew, we seem to be losing you from time to time so if you could wrap up your comments. Hopefully your line will clear up once we get back to you.

Andrew Okay what I was saying is the new regulatory frameworks which are in place right now, they are very good at addressing that challenge when the grid comes and the entire issues about composition framework and the whole discussion about how do you connect and sell to the main grid if the main grid comes. So, still have the room to operate on the off-grid, but at the same time, if the main grid comes, you can that option to negotiate with them main off taker. Thank you so much.

Yasemin Thank you. Alexander, did you want to go next?

Sanjoy Yes, thank you. I think Andrew has made the key important point about technical standards and interconnectivity to the grid. I would like to step back since you asked the question about coordination—just step back to point out two overarching approaches which we encourage. One is an approach about understanding the resources are finite and to effectively utilize public finances. To use parameters like population density, socioeconomic considerations, and use public finance where it is most needed and where private sector would not go in at the first choice. And then encourage private sector to go in where there's already tourism potential. Where socioeconomic considerations exist. So I believe in an overarching issue of allocating resources is what we'd encourage.

The second point, and I think Alexander brought this out, is around business models of mini-grids. Here, obviously we know that mini-grids economics are still very much a question mark. So it's important for us to augment the economic return with the impact return. You know, what is the socioeconomic impact that mini-grids create? And be able to filter that in the decision making of allocating capital.

Yasemin Great. Thank you Sanjoy. Alex, did you want to chime in as well?

Alexander

Well maybe just briefly. From what we've been able to see so far there are many different ideas about how to make a business out there—many different business models. They differ in their general orientation, in their setup, in the way they are financed, what the expectations are for rate of revenue, and so on and so-forth. So some of them are entirely pivotally set up and entirely privately financed. Some are grant-supported, some are PPPs. There's a wide range of ideas out there—not all of them work. Sanjoy was just speaking about the difficulty of making them attractive to financiers in certain settings. That's a big problem, of course. Clearly there's many ways that the investment environment can be improved through the work that has just been presented by Andrew and Sanjoy; which I believe is an enormous contribution. But, also through shortening the very costly, and lengthy, and in many countries, very in-transparent permitting processes. We heard from Andrew about the importance of technical standards and quality standards. There's really a lot that countries can do. I think we'll likely all agree that we're at the very beginning of learning how to create such an attractive investment environment and what business models can then work.

Yasemin

Great, thank you all. I'm aware of the time and I want to make sure we have enough time for the audience Q&A so just to wrap up this portion very quickly—if all three of you could give one or two recommendations that you may have for people looking to enter the Tanzanian market. Obviously focusing on mini-grids again, but if you do have any suggestions on the distributive energy side, as well. Andrew, maybe we can start with you, again?

Andrew

[Inaudible]

Katie

Andrew, I believe your mic might be on mute.

Andrew

Oh, sorry for that. Very quickly I would like to say that it is key to understand the regulation and framework for the specific country. It's key also to understand the entire business model. What kind of business model are you trying to develop and invest in? Is it a 100 percent off-grid? Is it 100 percent connected to the main grid? Or 50/50 kind of? Connected to the main grid, connected to the community's off-grid. Also, if it's the off-grid, what kind of model do you really want in terms of the connection to the households because there are different models that people are piloting in the country. All of them have different challenges as what Alexander said, we're still on that learning process and see which one is viable and which one is not. But, key issues the regulations another one is access to information and the entire business model and how it can work and which one works better. Thank you.

Yasemin

Perfect, thank you. Sanjoy, did you have anything to add?

Sanjoy

So from my point of view and equating the words of some of the entrepreneurs we have worked with, your question is about people—parent business entering Tanzania. Our recommendation is really simple, which is to be very strategic about choosing where to start your business in. You do have to engage, you do have to market, and you do have to go through that process which every technology needs to go through. Which is, go through early-

adoptive markets, then reach mainstream. It's definitely important to focus your resources as a big region using well thought-out criteria.

Yasemin

Thank you Sanjoy. Alex, did you have anything to add before we move on to the audience Q&A?

Alexander

Maybe two quick things. One is, I think for all of us a challenge or a task which is I think we need to do a much better job in building the joints between local communities—not just the governments within countries like Tanzania. Tanzania is already a great leader on this and many other countries in Africa are far behind and they're just starting to look into the issues and just starting to understand it. So building a joint between them and the financing mechanisms that are out there. Private sector—I think we'll likely all agree—has to play a really major role in this. But in many cases, the market just isn't there for private sector involvement. There is a strong role for international organizations to play for bilateral support, for really creative models for equity-based financing. So, building these joints between the international community and local governments is the one key area where I think we have to do a lot better job. There's a lot of talk about all these billions sitting there on the sidelines waiting to be invested and it's not happening and we need to figure out why that is. That's the one thing.

The second one is, I think we need to—as we get through the local grounds—we need to work much more closely with the local communities and discuss with them what it is that they need electricity for. I think we're often simplifying this topic a lot. For example, through thinking of access to light, which is a very important thing, but which can be done through standalone systems. Maybe sometimes better than through mini-grids. Mini-grids have different functions to play and I think it's local communities who have to bring forward what it is they really need these specific technical applications for. Based on that input, it's important to build the support mechanisms.

Yasemin

Great. Once again, thank you, Andrew, Sanjoy, and Alex for being with us today and for these great presentations and also great insights. I'm going to turn it over to Katie and Stephanie. Hopefully we have a little bit of time at least for the audience Q&A. Thank you.

Katie

Thank you Yasemin for that wonderful discussion. We do have time for the questions. We've had some wonderful audience questions. I will begin with Andrew. Andrew, there was a question on how often is the mini-grid data updated to keep up with changing regulations and are these tools available freely to the public?

Andrew

Yes, thank you so much. First of all, that's a very good question in terms of updating the portal. We're working with REA and EWURA on that and we expect once these key documents—for example, there is a recently-released document from Nemke and EWURA which are very key for the mini-grid system sector about _____ them including the net metering as well as the expedited and the solar checklist. Once they're ready we'll start updating them as soon as they officially make them public. The idea is to have all these agencies themselves updated and if possible, _____ will keep updating and

supporting the government agents to update for the next two, three years. These tools are available and you can download all those documents. You can access this web portal. All the details will be shared at the portal and people can easily access them.

Katie Wonderful, thank you Andrew. Sanjoy, same question. Do you wanna talk about the tools and how often they're updated for you?

Sanjoy Yes. The tools are public, open-source as it was mentioned at the beginning of this webinar. This is one of the early times it's being exposed. In terms of updating, at this point in time, the data sources that we have used has been largely census data 2016 update of the REA which have not challenged us to update on a real-time source. Our idea is to open that up to practitioners who integrate with other tools. When we do that, we would go very much in the same way as Andrew mentioned which is to have stakeholders—which is to empower stakeholders to be able to update data on this platform seamlessly from their own data sources.

Katie Thank you, Sanjoy. For all the panelists, what are your requirements from the private sector and what types of partnerships do you prefer?

Sanjoy Please, can you come again on that question?

Katie Sorry, we'll move to the next one. Sanjoy, what is the process to establish the baseline for the kerosene consumption map?

Sanjoy The kerosene consumption map baseline was the 2012 census data which is the universe of all households in Tanzania who were polled as to where they get their electricity from. The questions and the options that they had to choose was kerosene, candles, off-grid, or other sources. At that point of time in 2012, there was an overwhelmingly large number which was kerosene. We do see a trend change on that in 2016.

Katie Wonderful, thank you Sanjoy. For all the panelists, what's the timeline for the regulatory framework to enable to mini-grid to sell to the main grid when it comes to Tanzania?

Andrew Thank you so much for that question. It all depends on the regulatory, that's EWURA. Because you need to have discussions with EWURA and TANESCO. In this case, TANESCO is the main off-taker connecting to the main grid. So there must be a lot of intent and the discussion with TANESCO first. Once TANESCO shows interest and are willing to connect to the main grid, then you can discuss that with EWURA so that the entire SPPA document can be drafted to reach agreement that you are going to connect and sell power to TANESCO and the XY-regulated tariffs. Now the question is how long will it take for the negotiations between you and TANESCO. That can be unpredictable because depending on the key issues on the table on both sides. As you know, the main utility TANESCO is public utility. Sometimes you might say, they agree to discuss in two months and within that time something come up with a government which is high priority for them then they push you to one month later or two month later to have a negotiation.

But usually it should not take more than six months to have this agreement if everything is in good place and in order and all the documents are in place and the off-taker have shown interest to buy power from you. Yeah.

Katie

Thank you so much Andrew. Our next question is: what happens if two different foreign companies happen to choose the same location? Sanjoy or Andrew, do you want to address that?

Sanjoy

Okay, let me try to address that. Before you operate, for example, you pick a place and you identify a location is say you want to develop your mini-grid or micro-grid. The first stage you're supposed to do is contact EWURA for them to give you a provisional license. During that process of you getting a provisional license, if it is above one megawatt. If it is below one megawatt, all you need currently is just the registration. So during that process of registration or getting a provisional license, EWURA would be able to tell you that this location identified already have been applied by XYZ. So, by going to EWURA as early as possible before you do any other cost or resource investment whatsoever, meeting with the regulator is very key. EWURA can tell you "this project is registered by XYZ so you cannot pick the same location." Or, "There's somebody else with a provisional license of that exact location, you cannot pick the same location." So, meeting with EWURA as early as possible once you know XYZ is the perfect location for you is very key. The next agency to meet with is REA because also REA they support these developers. Once they identify places, they need visibility studies also they register with REA. At the end of the day, each of them must be registered or have provisional license with EWURA. So it's key to visit these agencies before you put a lot of resources on the area which you have identified.

Katie

Great, thank you so much. Thank you for all the panelists for that informative question and answer session. We had tons of questions from the audience. For the ones we didn't have time to get to, we will 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 to 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 also now posting the webinar recordings to the [Clean Energy Solutions Center YouTube channel](#). Please allow about a week for the audio recording to be posted. Finally, I would like to kindly ask you take a moment to complete the short survey that will appear at the end when we conclude the webinar. Please enjoy the rest of your day and we hope to see you again at future Clean Energy Solutions Center events. This concludes our webinar.