CLEAN ENERGY SOLUTIONS CENTER
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The Poor People's Energy Outlook 2016: Putting Poor People at the Heart of National Energy Access Planning

—Transcript of a webinar offered by the Clean Energy Solutions Center on 2 November 2016—
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Webinar Panelists

Lucy Stevens	Practical Action
Aaron Leopold	Power for All
Jessie Durrett	Global Alliance of Clean Cookstoves
Yuri Lima Hardem	ECOWAS
Ishrat Shabnam	Practical Action
Robert Ddamulira	World Wide Fund for Nature

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Eric — Hello, everyone. I'm Eric Lockhart with the National Renewable Energy Laboratory, and welcome to today's webinar, which is hosted by the Clean Energy Solutions Center in partnership with Practical Action. Today's webinar is focused on the 2016 edition of The Poor People's Energy Outlook.

One important note of mention before we begin our presentations is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of my best practices resources reviewed and selected by technical experts.

Before we begin, I'll quickly go over some of the webinar features. For audio, you have two options. You may either listen through your computer or over your telephone. If you choose to listen through your computer, please select the mic and speakers option in the audio pane. Doing so will eliminate the possibility of feedback and echo. If you choose to dial in by phone, please select the telephone option, and a box on the right side will display the telephone number and audio PIN you should use to dial in. Anyone who's having technical difficulties with the webinar, you may contact the GoToWebinar's help desk at 888-259-3826 for assistance.

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Today's webinar agenda is centered around the presentations from our guest analysts, Aaron Leopold, Lucy Stevens, Ishrat Shabnam, Robert Ddamulira, Yuri Lima Hardem, and Jessie Durrett. As you can see, we'll hear from Aaron, Lucy, and Shabnam, and then we'll have a Q&A about that first section, which is a little bit different than our standard format, and then we'll turn to Robert, Yuri, and Jessie, and then have a longer Q&A session at the end.

These panelists have been kind enough to join us to discuss the 2016 Poor People's Energy Outlook and its focus on national energy access planning from the bottom up. Before our speakers begin their presentations, I will provide a short overview of the Clean Energy Solutions Center initiative. Then, following the presentations, we will have a Q&A session, as I said, where the panelists will all address questions by the audience, and then brief closing remarks followed by a survey.

This slide provides a bit of background in terms of 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, Sweden, and other CEM partners. Outcomes of this unique initiative include support of developing countries and emerging economies through _____ resources on policies relating to energy access, no cost expert policy assistance, and peer to peer learning and training tools, such as this webinar.

The Solutions Center has four primary goals. It serves as a clearinghouse 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, learning, and peer to peer sharing of experiences. And lastly, the Center fosters dialogue on emerging policy issues and innovation around the globe. Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries, but we also strive to engage with the private sector, NGOs, and civil society.

The marquis feature that the Solutions Center provides is the no-cost expert policy assistance, known as Ask-an-Expert. The Ask-an-Expert 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 energy access, we are very pleased to have

Catherine Diam-Valla from Accessible Energy serving as one of our experts. If you have a need for policy assistance in energy access 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.

Now I'd like to provide an introduction for today's panelist. For time, since we have a number of panelists, I'm going to keep the introductions very brief, but also note that the slides are available on the website.

Aaron Leopold is Practical Action's global energy representative, as well as being deputy director of global advocacy for Power for All. Presenting with Aaron on Practical Action will be Lucy Stevens, who's a senior policy and practice advisor in the energy and urban services group within Practical Action. Ishrat Shabnam will follow Lucy and Aaron, and she'll speak from her perspective in her role as program manager at Practical Action Consulting in Bangladesh.

Then following that first brief Q&A session, we'll have Robert Ddamulira, who is energy coordinator at World Wide Fund for Nature Africa. Then following Robert, we'll hear from Yuri Lima Hardem, who is coordinator for the ECOWAS Renewable Energy and Entrepreneurship Support Facility. And our final speaker is Jessie Durrett, who is a senior program associate at the Global Alliance of Clean Cookstoves. Sorry, just a little bit of a delay in the slide there.

And with those introductions, I'd like to welcome Aaron and Lucy to the webinar.

Aaron Thank you so much. We're just sharing our screen now. So I'm Aaron Leopold. Thank you so much for the kind introduction. And as you mentioned, I will be presenting with Dr. Lucy Stevens.

Lucy Hello.

Aaron I'm going to start out now with the presentation of The Poor People's Energy Outlook, which as many of you know is a publication that is a series that has existed for a few years now, and has become a global kind of reference point for the energy access community to help bring the conversation forwards in terms of thinking ahead and understanding where our thoughts and actions need to be going in the future to make sure that we can address the issue of global energy poverty in a fast and meaningful way.

The previous editions of The Poor People's Energy Outlook have really focused on changing the discourse around energy access, and by this, I mean previous to our 2010 edition, most energy planners and donors were thinking about the numbers of connections and the numbers of megawatts. And progress on any of those was considered to be really, really important in ending energy poverty. And of course, we know today that it still is very

important, but that does not actually—those two metrics do not meaningfully address the needs of the energy poor.

And previous editions looked at the need to pay attention to energy services, and specifically around household, community, and productive energy services in a framework that Practical Action calls Total Energy Access, or TEA. And so this slide shows you our energy access ecosystem approach, which is the Total Energy Access ecosystem. And while the first three editions of The Poor People's Energy Outlook and our last edition, which summarized them together, they focus on how to think about energy access differently.

And these new three Poor People's Energy Outlooks are focusing on how to do energy access differently and more meaningful for the energy poor of the world, but we also feel that the lessons contained within this PPEO and future ones are going to have broader implications for positively reframing how energy planning, financing, and implementation is done around the world.

So with that, I wanted to just focus for a minute on why we really want to focus on energy planning, which is the focus of this PPEO, as a centerpiece for our new series on how to do energy access differently. So we have the Paris Accord. We have the SDGs. And we know that energy is central to both, central to the success of both, but not only does it have to be accomplished by 2030 as the SDG timeframe outlines, but actually, for good health, for no hunger, for quality education, for climate, for peace and justice, for all of these things to be meaningfully addressed and to be achievable by 2030, energy has to be there first. You cannot have no hunger and high quality medical infrastructure in 2030 without having energy there years before.

And so our call with this report is really about showing the urgency in the need to change our perspectives on how to deliver energy access, because we know to date planners and donors and practitioners have largely focused on what we know how to do, and what we know how to do hasn't been working.

And so this Poor People's Energy Outlook is really looking to flip that perspective, because we know unfortunately from the literature and from evidence on the ground that actually, by 2030, it is currently predicted in the IEA reports, in the World Bank's own internal evaluation of its own energy access work, both of which predict that energy access will actually be increasing by 2030 because of population growth and the ineffectual nature of energy planning and deployment for addressing energy poverty needs. So this startling fact leads us to the conclusion that none of the SDGs can realistically be achieved either if we don't change the paradigm in energy first.

So with that, we wanted to briefly explain why it is that energy planning is kind of inappropriate and not necessarily working to date. And one of the reasons is that energy planning is simply extraordinarily difficult. It is not easy to plan for an entire nation's infrastructure based on a technology set that is changing constantly, where new options are popping up all of the time,

where political interests play a big role and get in the way, so to say, of engineers' kind of logical planning needs.

But on the other hand, this image really shows how despite the fact that we have a lot of difficulties in energy planning, the realities are often that we're using outdated approaches, if you look at big grids versus the small-scale needs of many rural communities, but you also have inappropriate solutions matched with the needs. So this image is one of these kind of iconic, necessary, but not sufficient images, where of course this medical technician or this doctor needs light. But this is not enough for him to do his job well. So it is something that—just providing some type of energy access, that doesn't necessarily mean you solve the energy poverty problem.

And one of the primary conclusions of this Poor People's Energy Outlook, which I'm going to hand over to Lucy to describe to you in a moment, is that if you read this sentence here, energy planners suffer from a under—a deficit in the understanding of their customer. They really do not know how to address the needs of the rural communities that they are aiming to serve, because they are forced to do centralized planning the way that it has always been done. And with this Poor People's Energy Outlook, as Lucy's going to take over in a second, explains an alternative way to do that, which we feel, and we evidenced, actually better serves the needs of everyone involved, including the planner. So with that, Lucy, take it—or I'll hand it over to you.

Lucy

Right. Thanks very much. So as Aaron said, in this edition of The Poor People's Energy Outlook, we've addressed the question of national planning from the bottom up, starting with the needs, priorities, resources, and opportunities available to those who are currently living beyond the grid. And our idea was to—based on that kind of community, people-centered approach, to hold those results up as a mirror against existing plans to see what mix of solutions would deliver what people need at least cost, and also within our challenging 2030 timeframe.

We need to thank in particular for supporting this and future editions of The Poor People's Energy Outlook our donors _____ UKAID and the Mott Foundation and GIZ.

So in approaching this, we took a case study approach, selecting three contrasting countries with different opportunities and challenges. So one was Kenya, a country which is well known for its vibrant small scale solar and cookstove market, and with a generally consultative and inclusive approach to energy planning.

We looked also at Bangladesh, and we're going to hear more on that from our colleague after us, Shabnam, after that. Bangladesh is a huge and densely populated country with a world-famous solar home system program, but with very little traction on clean cooking, and enormous environmental vulnerabilities, which make the situation even more challenging.

And finally, Togo in West Africa, an example we felt of a smaller country with higher levels of poverty than the other two, and only recently emerging from a period of political instability, and with a government that's keen to address energy access, but with limited resources, and with very thin markets.

So what did we do in each case? Well, we didn't try to pick a representative sample of communities to work in, but we chose four communities that would be illustrative of the variety of geographic and socioeconomic contexts in each case, that would illustrate the situation that is faced by millions of their fellow citizens. So for example, in Bangladesh, we looked at one coastal community that relies on fishing, another which is subject to seasonal flooding, a mountainous area, and then finally where there's a mixture of small hold agriculture and some small rural non-farm industries.

And in each case, we used a community energy planning approach which adopted our total energy access framework. So first of all, we mapped the resources that were available, energy resources, and the technically feasible solutions. Then we looked at people's current levels of energy access, adopting and applying the _____ World Bank multi-tiered framework to look at the tiered level of access.

We discussed and assessed, came to consensus within the community, about the needs and priorities in these different spheres of home, work, and community. And then finally, we modeled what would be the least cost means of delivering that level of energy demand. And we compared—and within that, then we compared the cost of—the real cost of grid extension with upgrade options and a range of cooking solutions. And throughout, we applied a really strong gender focus, looking at the different needs and opportunities for men and women throughout that.

So just to highlight a few of the key findings, one of—some of—one of them relates to affordability and access. We found that yes, there is, as you might expect, a good spread of small scale solar. Actually, it's quite impressive. In some of the communities, over 60 percent of households had a small-scale solar product. But even within those, there's clearly an income gap. The poorer households within those communities couldn't afford them, and in some communities and in some countries, the solar product markets are still very thin.

Even when people do have those products, they are providing quite a low level of supply. That's what they're designed for. They're mostly at tier one, or sometimes not functioning well, just in tier zero. And in the vast majority of cases, people wanted energy services, but given the current efficiency of appliances that are available in those markets, would require at least tier two, if not tier three, level of electricity supply, and often more would be needed for small enterprises.

And cooking, unsurprisingly, there's a huge reliance still on biomass fuels, mostly wood, and very basic stoves. And in fact, in—less so in Kenya, but in Bangladesh and Togo, there were very few examples of manufactured stoves, and there's a huge amount of time invested in collecting and preparing fuel

and cooking. In Kenya, we found that in the most—in the community that was most fuel insecure, women were spending 58 hours a week on those tasks, on average.

We found that people's needs and priorities, when we asked them to compare their needs and rank them across households, community needs and productive uses, that they start with the household, that's cooking and lighting and fanning and cooling and so on, but they extend beyond that. So for example, for women, we found that key priorities include crop processing, drawing water, as well as lighting outside their household as well as inside, for security, and to be able to use their toilets at night, and so on.

So the least cost solutions that we were able to model, we looked at need to encompass a lot of those different elements. We found that when we modeled that, that you get both dispersed households, which would be best—at some—some dispersed households which would be best served by standalone solutions, as well as the clustered households, that are most—best served by mini-grids. But overall, we found that in 11 out of the 12 communities that we looked at, mini-grids or standalone solutions were cheaper or cost competitive with the real cost of grid extension.

In terms of cooking, as I've said, we found that actually, tier two or three biomass-cooking solutions would actually be cheaper than people's current cooking solutions, especially when you factor in the cost of fuel, which often is collected for free. And also, we found, interestingly, there's a huge enthusiasm for clean fuel solutions, even though these are more expensive and out of reach of—for some at the moment, but a lot of enthusiasm _____ those.

As I've said, people prioritized issues around community facilities, especially for education, and also street lighting. They were really highly prioritized in the communities we looked at. But they're not usually—those needs are not very often reflected, and there's little integration in planning between those different ministries.

And finally, when we were looking at productive uses, small enterprises, things—water pumping and farm appliances, crop processing as well, we could see that there were big needs, and they were expressed by small hold farmers and people doing fishing, that we also looked at. And also big needs especially for post-harvest processing or storage.

In each of the communities, there was a varying level of the existing amount of small enterprise activity, but on average, about a quarter of the electricity demand could be accounted for by these small enterprises.

So I'm going to hand back to Aaron and he's going to wrap up with some of the—what we're—what are our key recommendations are, based on those findings.

Aaron

Yeah, thanks, Lucy. So that was a lot of information to take in, but a couple of things I hope stood out there, and one of them was that in 11 out of 12

cases, that distributed options were cost competitive or cheaper than grid extension. And what we did was a least cost model, and this did not include a time dimension. And one thing that we have to say is that we also know that in many of these countries, as Shabnam, who will be presenting next, can surely go into a little bit more detail about, is that the grid in all of these countries is very unreliable.

And so our approach to integrated planning basically showed that distributed options are cheaper. We know also that they provide more reliable power than grid extension, but also that they can be deployed much, much faster than the grid. So these three things combined really showed us that using integrated planning provides better results, and in this case, we really want to emphasize that there is a very strong argument and set of evidence to say that energy planning right now is costing money that doesn't need to be spent. It is wasting opportunities by leaving people in the dark for years while they wait for the grid. And of course, they do not provide options for clean cooking, which is one of the biggest scourges of humanity right now, with the World Health Organization just last week coming out with a report that air pollution is one of the number one—or no, it is the number one killer in the world today, and cooking is one of the major causes of air pollution, especially household air pollution, in many countries around the world.

So basically, these four calls to action are around promoting integrated planning, and we want to encourage everyone on this call today to join us in this call, to help decision makers understand the options that are on the table for them, to really take a level playing field approach to the technologies and the approaches that are available in 2016 for energy planning, rather than only using what has been kind of traditionally used before.

We also want to emphasize that there's an urgent need to reprioritize cooking. Universalizing clean access to cooking, to modern cooking, will cost we found about 10 to 15 percent of the global electrification costs. So it is a fraction of the cost, and has massive benefits, both gender-related benefits, health benefits, environmental benefits—the list goes on and on.

The third point here is recognizing differentiated needs between not only different members of the community and different productive versus community versus household needs, but particularly around gendered aspects. At the moment, planning is gender blind, and this is a major problem, as Lucy outlined, in some of the communities 58 hours per week on collecting and cooking needs.

And the last point that we wanted to make is that while the multi-tiered framework measures what's meaningful in terms of energy services, what would be really meaningful and help planners and donors better understand the costs of the choices that they make, is to actually measure how many jobs per megawatt are coming out of these plans. How many children vaccinated next year are coming out of these plans for electrification of rural areas? How many children are being educated in modern or in classrooms equipped with modern communication technologies? And we think using these metrics

would be much more meaningful and really change the perspective on energy planning.

So with that, we're trying—there should be one more slide. Sorry. It's just not jumping there. And the two main things that we concluded, as avenues to accomplish these objectives are really to help inform decision makers better about the options that are available to them. Many energy planners and decisions makers within donors and relevant utilities and ministries are simply unaware of how much things have changed since 2005. I know that since 2009, for instance, the price in solar in the US, for instance, has dropped over 80 percent just in the last 6 years, and in developing countries, compared to the reference points that many people have of the problematic solar of the nineties and early 2000s, these technologies are fundamentally different than what people really think that they are.

And so really educating people, including decision makers, on these new technologies and approaches is one thing. And then the second is bringing the voice of the energy poor into planning. This will help with that know your customer deficit that we were talking about before.

So I think we're a little bit behind time, so I'll wrap up very quickly here. What's next? So this Poor People's Energy Outlook looked at planning from the bottom up. In 2017, we're going to look at financing from the bottom up, and in 2018, we're going to look at implementing from the bottom up. And the arguments and the detail of the kind of bottom up approach will be growing in complexity, but also in its robustness over the course of these three editions. And so we really hope that we've sparked some new ideas and some inspiration in you with this presentation.

And with this, I would like to hand it over to Shabnam to talk a little bit about the Bangladeshi experience with The Poor People's Energy Outlook work, which I also want to mention, throughout the three countries and at our headquarters, involved the hard work of over 20 people over almost a 2 year time period. And so I just wanted to thank everyone who's been involved in this. And with that, thank you so much for listening to the presentation, and we'll hand it over to Shabnam.

Eric Thank you. Thank you very much, Aaron and Lucy, for that great introduction. Shabnam, we see your slides, so feel free to jump in. We are a little bit behind time, as Aaron mentioned, but I think we can make it up in the Q&A session, in part.

Shabnam Thanks a lot, Aaron, and Lucy, for presenting the _____ PPEO. So for the audience, what I am going to do now is to focus on solely—solely on Bangladesh. So Poor People's Energy Outlook, out of the three countries, Bangladesh was one of the countries, and now I'm jumping into my first slide. This is the map of Bangladesh, as you can see, and here, it is the—it is the grid extension—it's the grid map, which you can see here.

There are two lines. One is—one is red colored. That is for the 230-kB line. And there is a purple that is 132-kB line.

Coming to the population, total population of Bangladesh, which a total of 16-plus million population, out of which _____ now connected to the grid electricity, population is 59.6 percent only, out of the 16-plus million. And the whole, if we look at _____ poverty, _____ poverty issues in Bangladesh, below poverty line, we have 32 percent people of the 16-plus million. We have 17 percent extreme poor people out of it. And of the people who are living in the rural area is the majority of the total population, which is 70 percent plus by now. So that's the country context in—from a perspective of electricity supply and grid services.

Having a look at the cooking and food related scenario is the total people who are—who use the solid fuels for cooking, according to SE4All, 2015, it is 90 percent plus population using that. And the number of people who are affected by the household air pollution because of cooking with traditional practices, that is 137 million plus. And the ones that—the deaths that can be attributed to the lack of clean cooking annually, that sums up to around 78,000 deaths a year. And finally, in use, the total number of improved biomass is 510,000 only, which is a very small number in total.

So how do we see the scenario? So as we know, stakeholders already acknowledge the fact that there is a need to utilize all available energy options, whichever are accessible, affordable, and within the reach. So both off grid and on grid are possible, and for clean cooking, we need to think of _____ and improved technology for cooking, but—which is actually rarely mainstreamed so far.

And the vast majority of interventions are around actually—focused around connections, grid connections, megawatts, and which is why the cheaper options, the more affordable options, more quality and appropriate options, are still overlooked, and government and donors are still investing their time, effort, and resources on designing and implementing policies and regulations and infrastructures which are actually—may have—may not be mentioned as suitable for all the communities who are residing in the country.

So which are the communities we try to look at? So PPEO had a focus to cover the geographic diversity of the countries we are looking at. From that perspective, we tried to select four different localities of Bangladesh, amongst which the first one, Bandarban, that is from the southeastern part, and it is from the hilly area. It has a hilly topography. And Barguna is from the southern part, which is more of an island-ish area. And Sunamganj, that is the area which holds the water bodies. In Bangla, we call it _____ areas. And Panchagarh, which is the upper—northern side of Bangladesh, and—which is mostly plain land.

So you can see the percentage of below poverty rate, and of course, the percent of electricity connections they can reach, so—of the—all of the Bangladesh, 35.2 percent are below upper poverty rate, and electricity connections are 42.5 percent, as you can see.

How did these communities located in different geographies prioritize their energy needs? So these opinions actually varied across the localities and the

communities. We tried to look at, as Aaron has already shared the total energy access approach. And so there, we tried to look at all the needs, and we could see that all the communities from different geographies, they prioritized household as the first place, but in case of second and third priority, there was a variety, and there was diversified priorities. In Thanchi, it was for business. Business solely refers to SMEs, small and medium enterprises, in most cases.

And in Tengagri Chak, they preferred as the second place the lighting, the street lighting, and lighting of the community areas. And school was prioritized by Alamkhali as the second place, and at Sardar Para, it was agriculture technologies. And in the third place, it was—for Thanchi, it was lighting. In Tengagri Chak, it was school, schooling, and Alamkhali it was health facilities, and again, for Sardar Para, it was school. So it was—the household priorities were unanimous for all the four localities.

So what were the key findings which we would like to highlight here as the outcome of the study? Under cooking, what we could see is although there is a discussion going around regarding the health hazards associated with the traditional cooking system, but it is not much yet acknowledged by the community itself. They tend to adhere to the traditional cooking system. And there are improved cookstoves, but the comments are mostly that these should be designed more practically, so that it can reach the need of—more community needs. And a huge demand for awareness raising is still there, which we felt _____ very much out of the study of the cooking.

For solar home system, which we could see there is—there is a good amount of supply for solar home systems in the rural area, because there are quite a good number of private sectors who are involved in the process, and they are funding the process for the profit making and also community service. But still, what we could see is people still do not have a level of energy access that they require, in the first place, and of course, the poorest are still unable to afford. It is still beyond the affordability rate of the poorest.

Again, as—

Eric Shabnam, I'm sorry to interrupt. This is Eric here. Just to let you know, we're running a little bit long on time, if you could wrap soon to go to Q&A for this first section.

Shabnam Oh, sure.

Eric Thank you.

Shabnam Under mini-grids, what we see is we could propose a solar-diesel hybrid mini-grid system which may work out, _____ cheaper, and that can be a better option for that. And under gender aspects, we could see that the gender needs are still not much addressed under any of the energy access prioritization. So that needs to be taken under consideration.

So under recommendations, I'll make just four points for each of the area. One is to—we would recommend review of national plans to increase focus on decentralized solutions, and promoting new products and programs to—new products and programs to reach the poorest, and implement national awareness-raising campaigns for clean cooking, as I mentioned already. And of course, including plans for electrifying schools in national plans, and there should be an increase in focus in national plans on the needs of smallholder farmers, which will help to develop our agriculture sector with a greater focus.

So that's where I wrap up my presentation. Over to you. Thanks a lot for a patient hearing.

Eric

Thank you very much, Shabnam. That was a great background from the Bangladesh perspective. So we'll turn to a quick first Q&A here, and just to the attendees, a reminder to please ask questions in the question pane throughout. We have a few in, and maybe we'll just address two very quickly now, and then we can get to the rest at the end. And also, a reminder that these slides will be posted on the Solutions Center website, so you can look at them more at your leisure later.

So the first question is perhaps more to Aaron and Lucy. If you could speak a little bit more about the tiers and talk about energy access being tier two to three for households, but three to four for SMEs, and what that means for progress already being made.

Lucy

Yeah. Thanks. That's a great question. We used—we used the World Bank's multi-tier framework of measuring energy access, and actually, we're recommending that that's a great way for planners to look at how they can—how they can access progress that they made at the national level. And in fact, the Kenya Action Agenda, the SE4All Action Agenda, sets targets for people across—for its country's level _____ across those tiers, and that's great.

What we've found is that when we looked at—we asked people what energy services they would—they needed, they would prioritize, and that was things like a certain level of lighting, a degree of—like being able to run a fan, a particular number of appliances they might want to run in a house, different kinds of TVs. And we looked at the amount of energy demands, electricity demands that those would—those would require, based on the currently available appliances that they would be able to buy in those contexts.

So that is obviously not the most efficient that are available in the market, because those really super-efficient products, we didn't find them available in the communities that we were looking at, even though we know they exist in a small way in some of the markets globally.

So what that means is that the amount of energy that people needed, the amount of electricity that people needed to run those services that they wanted, would require them to have a tier two or a tier three level of energy access. So that is actually for energy over a certain number of hours a day, a certain amount of energy.

And one of the things that—and for small enterprises, some of them require the longer use of higher power appliances, like fridges or like higher power machinery, pumps and that—and grinding machines, that kind of thing, that require a higher amount to power _____, and also some lower power appliances that are—that they would like to run for longer periods while their businesses are open. And so what that meant is that that gave them then a higher amount of energy demand.

So basically what we're saying is that we would—we are suggesting that at the current levels, we would really love the global community to set a level of tier three access at the minimum at which energy access becomes truly enabling of development, but at the same time, measure that—the progress at the national level across all of the tiers, which would be really important, so that the people at the bottom end of the tier are not being left behind.

Aaron Yeah, just to add one thing, so this is one of the very contentious points about The Poor People's Energy Outlook. We've gotten criticism from people saying that how can you say tier three is acceptable? Everyone should have access to the best power, and saying that this lower level is okay means that we're consigning people to a lower level of opportunity and service quality.

But then, of course, from the solar—the small solar community, we've gotten pushback as well, saying that, well, if we're calling for tier three, then some of our products don't count, and we don't want the success of this industry to be hurt by calls like this.

And our approach is to just really go with what the people—with poor people's wants and needs. And the reality is that the solar industry is catching up so quickly that a lot of the solar home systems, the best solar home systems out there, are already reaching levels where they are coming up to tier two and tier three of the global tracking framework.

And so just to conclude, we are not saying that tier three is the only thing that is acceptable. What we are saying is that until you reach tier three, you still have to try harder. Providing everyone with a lantern does not constitute universalizing access one particular area, and this is what we are saying.

So there is space for every technology, and you will see in the report that we mention how small solar is fundamental to universalizing energy access, but it does not alone solve the problem. That was the point. So that was a long answer, but you kind of asked the most kind of contentious question right off the bat. So this is why we gave you such a long answer on that one.

Eric No problem at all. That was great background, and I think very helpful for folks to understand how the tiers translate. Given that that answer was a touch longer, I think instead of going to the second question, which pertains to gender considerations in the PPEO, that we'll just turn to Robert now, because I think the gender conversation will be one that others would like to comment on as well. So with that, we'll turn to Robert.

Robert Yes. I will just share my screen.

Eric Okay.

Robert Okay. Can you see it?

Eric Not yet. We hear you well, but don't see your slides just yet. You should see a pop-up that allows you to share your screen.

Robert Can you see it now?

Eric There we go. Yes. And if you could just make it full screen.

Robert Okay. Super. So yeah, so I just wanted to share a few quick reflections on the report, on The Poor People's Energy Report. And first of all, my name is Robert Ddamulira. I work with the World Wide Fund for Nature at the Africa Energy Hub here in—based in Kampala. And I'm sure that many of you know what WWF is. Now the screen is not changing. Oh, there we go. Okay, there we go.

All right. So WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature. And sustainable energy is among our nine global priority practices, which include, among others, wildlife, forests, water, food, oceans and fisheries, governance, finance, and markets.

The countries where we operate include Kenya, Tanzania, Uganda, DRC, Cameroun, Madagascar, Mozambique, South Africa, Zambia, Zimbabwe, Rwanda—we don't have a physical presence there, but we do have some opportunities _____ energy there, and Gabon, where we are just starting to engage a little bit.

So an overview of our work is we are largely involved in scientific research. We undertook a couple of studies that inform our policy engagement work, as well as our field interventions. But we also do policy advocacy in itself. We have organized a couple _____ stakeholder engagement platforms. In fact, right now, I've just jumped out of one where we are bringing together certain countries to discuss issues to do around the Sustainable Energy For All. So the report was really very helpful in that regard, by nourishing such discussions and dialogues.

But we're also involved in civil society capacity and strengthening, because we believe that CSOs have an important role to play in bringing about the sustainable energy future we want, either through research themselves, or serving as sort of social businesses that work with local communities _____ or basically undertaking research and partnering with private sector or playing a watchdog role.

We also are engaged in sustainable energy access field level interventions, and we have nine pilot sites that are spread across five countries, Uganda, Kenya, Tanzania, Zambia, Zimbabwe, Madagascar, DRC, and others.

And so we've been doing this for the last ten years, largely starting in 2007 through to 2015, and over this time, we have analyzed or engaged in the review of over 90—over 80 national and international energy policies. We have also been directly playing a part through our field level interventions to bring energy access to 1.2 million people, largely focused on clean cooking and lighting, and have strengthened the capacity of 60 civil society beneficiaries. And in total, roughly, we have invested across the various countries approximately $20 million over the last 12 or so years.

So I want to speak specifically to the—to The Poor People's Energy Outlook report, and basically, when I looked through the report, it was really very, very much aligned to the kind of work which we do, because oftentimes, energy policy planning or energy planning in general happens in capitals, and very few, if any, voices from the field are actually integrated. So I was very happy to see that Practical Action _____ looked at this from a more bottom up approach.

The report findings I must say that are validated to be true, based on our experiences. In particular, I could point out that the emphasis on clean cooking, this is something that hasn't featured very much in a lot of the energy planning that we have had. Like for example, about an hour or so ago, when the Kenya government was finalizing its sustainable energy action agenda, clean cooking was barely featured in that first draft, but we sort of advocated with Practical Action and other CSOs operating in the Kenyan environment, and basically, it was integrated.

But that is just one simple example of how quickly people's needs, and in this case, biomass energy meets nearly more than 90 percent of all primary energy needs in countries like Kenya. So the fact that energy planning can overlook such a big issue really is telling. And so just linking that to the report, it is clear that what the people want is actually that household energy, whether this be in Bangladesh, Togo, or Kenya.

And last but not least, I must say that for me, I think—this is just more or less like a common thread, that perhaps we need to focus more on demanding for a complete paradigm shift, because the kind of institutions, policies, and approaches that have entrenched energy poverty for centuries in countries like Africa, basically, what we are trying to work with to change the situation, and it is only fair to expect the same results, incremental results. So we need to really change that paradigm.

I don't know what the answer is. If I knew it, maybe we would have solved the problem yesterday. But I think what is key is realize that we have a problem with the current way energy is planned and delivered, and we need a complete paradigm change. So well done, Practical Action, Aaron, Lucy, and the team, and I look forward to promoting the report within our networks, and _____ _____. Thank you very much.

Eric Great. Thank you very much, Robert, for that background on PPOE and your work in Africa, specifically in Kenya and Togo. With that, we'll turn it over to Yuri. I see your slides, Yuri.

Yuri Good morning, everyone. Can everyone hear me?

Eric Yes. We hear you well.

Yuri Okay. Thank you very much. So my name is Yuri Hardem. I'm a renewable energy expert at ECREEE. And today, I will talk to you a little bit about ECREEE and energy access in West Africa.

So ECREEE is the ECOWAS Center for Renewable Energy and Energy Efficiency. It was established to support member states in realizing their renewable energy and energy potential. So the establishment was supported by some of our core partners, the government of Cape Verde, Unido, Austrian Development Corporation, and the Spanish Corporation. It was integrated in 2010, and we've been working since then, and it—we are also the focal point for West Africa, with SE4ALL.

So the ECOWAS region has 15 countries, and it covers an area of about 5 million meters square, and it has about 300 million people, out of which only—more than 50 percent has no access to electricity or proper energy services. And most of the population—we have about 60 percent of the population living in rural areas.

Regarding energy access, it's one of the parts of the world where people have the least access to energy, _____ for cooking, electricity, whichever. And so poor people, mainly in rural area, spend most of their income with low quality energy services, and they rely mainly on biomass, as previous panelists have pointed out, for their energy requirements.

So for electricity, household, we have only about 20 percent that have access to it. And from those 20 percent, 40 percent, only 8 percent actually, around 8 percent in the rural areas. So we really have a lot of work to do in the rural area.

So if we look at it country-wise within the region, we have some countries, such as Cape Verde, Ghana, and Nigeria, Senegal, that are doing much better than most of the countries. But most of the countries are looking—we're looking at less than ten percent of the rural population has access to electricity.

So given this scenario, the ECOWAS has decided to set some targets in order to overcome these barriers. So we have, for example, for 2020 and 2030, set some targets for household standalone systems, for mini-grids, for improved cookstoves, and also LPG. We also look at some part of the renewable, but this is mainly focused on renewable energies mixed with the national grid.

So if we look, for example, at the mini-grids, the target is to reach 60,000—I mean, to have 60,000 mini-grids installed by 2020, and 128,000 by 2030. So this target is _____, but there are several constraints and barriers that if they're not looked into, it will be impossible for the region to meet those targets. So this—we separated these barriers into three main groups. We have the financial/economic barriers, we have the policy, which—institutional

issues, regulatory issues, that are also considered as one of the major barriers. And finally, we have the capacity and—capacity building and technology transfer, which are also a considerable barrier for energy access and renewable energies in general in the region.

So I'm not going to go too much into details. You have the deck. If you have any questions, you can ask me. I'll be around, so you can ask me additional questions.

So in order to overcome these barriers, I think we will set up a number of programs, and this ECOWAS Program on Access to Sustainable Electricity Services is one of them. We also have another one that we—we have one that's specifically on clean cooking and gender and energy. But I'd like to talk to you a little bit about this one, because it's more related to today's subject.

So the EPASES focuses on bringing mainly sustainable electricity to rural areas. The overall objective is to help the ECOWAS Renewable Energy Policy to reach the targets that they set. So specifically, to overcome the constraints to achievements of the off-grid component of rural electrification by providing support to each member state in their policy environment, capacity development, information and knowledge, project and investment promotions.

And this is basically the core objective of ECREEE. We have these member states set up their action plan and meet the targets. So the aim for EPASES is to work with our stakeholders. We know each one has an important role to play, and throughout the past, some of them have been forgotten, and we always see that there's always consequences to it. So for example, in the private sector, for many years, we have tackled the energy sector without involving them, and now we've found out that many projects that are on the ground end up failing because we did not take into account the private—the local private sector.

We have three main pillars for this program, which his aligned with The Poor People's Energy Outlook report, which is clean energy mini-grids, standalone systems, and productive uses of electricity. And from this, we have four main results under policy support, capacity development, information and knowledge management, and the project development and investment promotion.

And just I'd like to highlight that ECREEE has helped most of the countries. I think, if I'm not mistaken, we only have one country left to approve the action plans. And all of these countries have also set their targets for energy access.

So these are some partners that we work with in our different programs. I'm not going to go into details with it. But that's—this was my presentation to you. And if you have any questions, feel free to ask me any time. Thank you very much.

Eric Great. Thank you, Yuri. With that, we'll turn to Jessie for our last presentation before we turn to Aaron and Lucy and then Q&A.

Jessie Hi. Can you all hear me?

Eric Yes.

Jessie Great. And you can see my slides? I'm currently making them to the wide screen mode.

Eric Perfect. They look great.

Jessie Great. So my name is Jessie Durrett, and I work for the Global Alliance for Clean Cookstoves. A lot of my work focuses on our advocacy work and our work as it connects to topics like this, and ensuring that clean cooking is part of broader global efforts to deliver sustainable development objectives and climate objectives. So thank you very much for having me.

If you're not familiar, I just wanted to talk briefly about the Alliance's approach. Throughout our efforts, and since we launched in 2010, our work has been really built around three different pillars of efforts, strengthening supply of cookstoves and fuels, and I want to emphasize that fuels are very much part of our work, a full range of fuels, in fact, and technologies as well, so where people have access or could have access in the near term to LPG, ethanol, other clean fuels. We work on that side of things, and then also on areas where that's not possible because of distribution capacity or price or other barriers. In all of our countries, we also work on other forms of fuel, including pellets and other forms of biomass.

Across our efforts, we work on creating an enabling environment, which I would put parts of this conversation in that bucket, where we're really working on the high-level policy efforts, the research efforts, the global standards, and testing efforts. And then lastly, we work in enhancing demand, which is really the behavior change communications effort. All of these are complimentary. And our behavior change efforts have really stepped up to a new level this year, and will really increase over the next couple of years.

One thing I'll just mention briefly is that gender and other kind of considerations like that were integrated into the Alliance's approach from the very beginning, and throughout the strengthening supply, enhancing demand and enabling that environment effort. So we really appreciate the gender considerations in the PPEO this year and past years. And the other thing that I'll mention which you might not all be familiar with is that the alliance's effort focused kind of both in the non-humanitarian space and humanitarian space, so in both cases, there is some component of the market-based approach, but in the humanitarian context, it's often UNHCR or other humanitarian agencies procuring and therefore paying for the products, not necessarily the refugees themselves. So there's a range of kind of approaches in that way, and I'd be happy to talk with anyone more about that and better explain kind of the different models.

And generally, I'll just say, too, that for anyone that's working in the clean cooking space already, we would definitely be interested in further

collaborating, and I'm sure that some of you are already in touch with some of my other colleagues, but feel free to reach out with any questions.

So I just—this is a lot of text, but I just wanted to draw out some of the language on cooking in the PPEO this year. We were really pleased to see that it was a major focus throughout the report, and understood as a key component of energy access, as well as a key component of addressing broader sustainable development and environmental needs. Throughout the report, there was a lot of focus on air pollution and the burden that it falls frequently on women, but on populations more generally, when they don't have access to energy access, and particularly when they don't have access to cooking energy. So that was really important for us to see, and you can see from this whole language that there's a lot of focus on clean cooking as part of reaching universal energy access and the health and environmental and what we would call time poverty impacts when energy access is not widely available.

I'm just going to the next slide. So some of the takeaways that I wanted to emphasize when we looked through the PPEO was overall, of course, addressing energy needs of the poor will be essential to achieving _____. We worked with Practical Action and other stakeholders on this call to help ensure that the understanding of energy access is strong within the sustainable development goals, and that issues like household energy are specifically included in the indicators. So now, we have that included.

Also noteworthy from this report is that if you ask people, they prioritize household energy, along with other needs, of course, but the household energy component is very clearly a priority for people, and yet often not understood as a priority by policy makers. Similar to what Aaron was saying previously, people are used to looking kind of at megawatts and these other large-scale needs, which don't often get to the needs of people's household needs and kind of the average citizens.

I think one other thing that was very important for us to see was that accounting for gender considerations will further show the needs for well-designed household energy interventions, particularly clean cooking. So if you account for the gender considerations, all of a sudden, household energy and especially clean cooking really jump to the front in a way that is not understood otherwise.

Reducing the amount of time spent on collecting firewood and water, as the report notes, really open up time for other tasks. And I wanted to specifically note how that actually really ties back to the other environments that other speakers in the report talk about. So for example, that people put household energy first, but then they also talk about the importance of energy access for health, health facilities and education facilities. And particularly in the case of education facilities and in the case of productive uses and in the case of SMEs and others, that if people are spending a lot of time on collecting firewood and other household energy needs, then it actually even inhibits their ability to take advantage of those opportunities in the—in an entrepreneurial way and in an educational way. So there's some interrelation there as well.

And also, the report talks about the really large need for behavior change communications focused on clean cooking, and if you're not already aware, the Global Alliance for Clean Cookstoves has been really elevating our work in this area. There is a widespread need for behavior change communications, and we recognize that. There really has not that much in this space. And we think that's really important, to focus on not just awareness. In a place like Kenya, there is, in some areas, at least, decent awareness of the importance of improved and clean cooking, but the kind of behavior change to now cooking with the new technology has not occurred.

So there's definitely a really large need for this, and we've actually launched some—or we are in the process of launching some very large scale behavior change work in Nigeria, Kenya, and Bangladesh, and we've had some smaller scale work in countries like Uganda, Ghana, Guatemala, and Bangladesh thus far, so we're really looking to step that up. And you can see the picture here is form our behavior change work, small scale behavior change work, in Ghana.

One thing I'll note, just—which is kind of clear here, is that while it's important to communicate the health benefits, that that's often not what resonates with people. They appreciate that it makes their lives easier, that it—you know, that there's other considerations, that it's economical. And so as we are doing that behavior change work and working with partners around the world, we're also really thinking about what messages resonate with specific consumers and what will motivate them to fully adopt new technologies and fuels. And while health is important and they recognize that, it might not be the motivating factor. So interesting to note there as well.

So this slide has a lot of information on it, but basically, what we've done here is spelled out how clean cooking can help deliver the—all of this—or ten of the sustainable development goals very specifically. And then I'm not sure if you can see it at the bottom here because of my bar, but it also says, and contribute to the entire Agenda 2030, which Lucy and Aaron mentioned at the front, that beyond the 2030 goal, there's also this idea that in order to reach all of these goals, energy access will be an important facilitator, and we need to ensure that we're making progress much quicker than that in order to enable gains in other areas.

So there's a lot of information here, some of which I think is not often spoken about. So for example—

Eric Jessie, sorry to interrupt, but if you'd just wrap soon so we could go over to Q&A, that would be great. Sorry to interrupt.

Jessie Understood. Understood. So just quickly, there's less understanding around the unpaid work. Luckily, that was talked about in the PPEO report. And there's less understanding in some of these other areas.

Just briefly, I'll leave this up so you can digest it for a second, and talk about some specific policy areas, which I can't go into in depth, but needs for work on the finance arena. I'm glad to see that PPEO will focus on that next year. On the tax and tariff policies that can be enabling to greater energy access

efforts in a distributed way, the need for informed measurement, and looking at not just megawatts and other areas, but looking at unpaid work and true access and what those outcomes are. And then also, there's an opportunity to more fully integrate clean cooking into NAMAs and other national plans to address the SDGs and climate action plans.

And with all of this, there's a really big need for capacity building to ensure that countries can realize the objectives that they've laid out. Very, very briefly, I'll just say that we've been able to do a little bit more work on the climate action plans of specific countries in order to reach the Paris Agreement, and over 50 countries specifically included clean cooking in their national plans, which is great to see, that there's really demand coming from countries. And these are 50 countries where there's currently more than 25 percent use of solid fuels for cooking. There's increasing demand, but it doesn't mean that the other steps that will allow for this realization of these objectives will be there. So really, a strong need for capacity building, financing, and other enabling policies to make it a reality. Thank you so much.

Eric Okay. Thank you, Jessie. Sorry to rush you there at the end. Aaron and Lucy, would you like to briefly respond to any of those presentations before we turn to Q&A?

Aaron Yes. Thank you very much, everybody, for the great presentations and your reflections on our report, which we are very happy to see that you found relevance for your own work. And just on Jessie's last point, you know, there are already a lot of really great initiatives out there that are trying to do work on behavior change and really capacity building and enabling environment creation. If you look at in the small solar context, for instance, the Lighting Global, Lighting Africa, Lighting Asia work that IFC has been supporting over the last couple of years has really been fundamental in seeing the regulatory environment, the private sector really gain legitimacy, and in general, the quality standards of the products also increase.

And these are the kinds of things that we need to be really, really visible and available in all technological areas, but also in particular in working with policy makers and regulators to really understand how these technologies are applicable to their daily work, which is something that a lot of people still don't see.

And one reason you can argue that in the solar context it's already been happening is that you basically have an independent, fast moving consumer good that doesn't really need government planning to work with. But in really addressing the clean cooking issue, where there's a big environmental component, and the micro-grids or mini-grids component, where there's a infrastructure component, these require a lot of attention and support.

And behavior change or advocacy or knowledge creation or capacity building, whatever you want to call it, is not the favorite thing for funders to support at the moment, but it's been identified again and again as one of the largest gaps. And so I hope you can join us in helping to talk to development

financiers, donors, philanthropic organizations, and country governments as well, about the need and an interest of a lot of utilities and regulators to really get up to speed on these new technologies and approaches. And I think this would be one of the main takeaways that we would like you to go home with.

This PPEO serves as a conversation starter. We know that it's only part of the picture. That's why we've got a couple more planned, to round out the series. And with that, I would love to answer any questions that you might have, and thanks again for participating.

Eric Great. Thank you very much, Aaron. So the first question we can turn to is the one I mentioned from the first Q&A that we didn't have time for, which pertains to gender. So there's a general question, then a specific follow-up, that I'll ask together. The general question is if you could explain a bit more about the differentiated energy access needs you found by gender, and what the implications might be for national planners and energy access practitioners. And within that, if you could speak specifically to the inter-household perspective in terms of demand, use, and control from a gender perspective.

Lucy Yeah. Thanks. It's Lucy here. Yes, we looked at—we—in the energy planning we did at the community level, we were really—we paid a lot of attention and we held sort of participatory focus group exercises and we talked to women separately, groups of women separately to men, and then we came—we brought people together in terms of consensus.

And it's clear that women have different—there are different gendered roles at the household level, in productive and reproductive tasks, and those are reflected in differentiated needs, in terms of energy access. And often, we'll find that there's also a power dynamic going on where women's roles are in a way valued—and women's time is valued less than men's time. And in some communities, because of the power—because of the power dynamic, and we need to kind of service this and see if we can get to a more equal situation where men and women's needs and priorities can—if we're going to achieve like a level of development for everybody, then we need to be working on those things equally.

So in very basic terms, often, we've found that women were more responsible for particular kinds of agriculture and particular tasks in terms of crop processing and things like threshing rice or grinding maize and farming particular kinds of crops. So that if you were going to, for example, invest in energy for irrigation, that might benefit particular parts of the community, whereas if you were going to invest in helping ease the burden of some of that crop processing, that might benefit women more.

Also, there were some interesting gender dynamics about the priority that people placed on street lighting. In a couple of contexts, women were actually not that—didn't prioritize general street lighting as highly as men, partly because their level of mobility after dark in the evenings is pretty restricted anyway. But they really did prioritize lighting outside as well as inside the

house, so—their houses, so that they would be able to kind of move about their area close to their house more.

So those are the kinds of things that you need—we need to be really conscious of when we're thinking about gender. And in terms of inter-household perspectives, I think here it comes to things around the choice of what people are going to invest in and who controls what pots of money. So in terms of—and I know Jessie will back me up on this one, but in terms of the choice to invest in a clean cooking solution at the household level, there's a lot of kind of gender dynamics related to who can take the—who takes decisions around that, who pays for them, and in terms of some of these behavior change issues, you have to be really conscious of working with some of the gender dynamics at the household level if you're going to successfully get clean cooking on the agenda, and to get people to take it up. Yeah. So I think I'll stop there.

Eric Great. Thank you very much. Would any of the other panelists like to comment on that?

Jessie This is Jessie. I can just kind of add on to what Lucy was saying that in our BCC behavior change efforts, we are attempting to take into consideration those kind of gender dynamics, and using a variety of kind of large broadcasting efforts, but then also one to one and group to group interactions, where people can talk about—in some cases husbands can talk about why—to each other why clean cooking is important for their household, and kind of help change the willingness to pay of the products that may benefit the women in their family, but—more directly, but can ensure that those conversations are happening.

And I just wanted to touch briefly on Aaron's point about the broader scale efforts that are taking place and the initiatives that are working. The Alliance is one of those initiatives, of course, but then also as we work behavior change, but also other areas of our work, we are really looking to further integrate our efforts into those areas, whether it's national health planning, behavior change work around other health products and needs, air pollution discussion on a national or regional level, so that people understand and can help integrate clean cooking, not as a separate way of working, but as another means to the objective, which I think aligns well with some of the people that have already spoken, like WWF, for example, seeing clean cooking as an important pillar to help achieve the objectives they've already laid out as an organization.

Eric Great. Thank you very much, Jessie. We have—the next question is about solar home systems. Before we get to it, I'd like to mention that for questions that we do not have time to get to, we'll reach out offline, for those attendees. So two attendees asked questions about solar home systems that are related, that I'll ask together. One is a question about the transition from tier two to tier three, and the capacity of currently available solar home systems to be able to provide those needs. And also asked in non-tier specific terms, another attendee asked about solar home systems and their ability to go beyond lights, radio, and TV and supply energy for other productive uses.

Aaron Sure. So this is Aaron. And this is one of the—this is a really good question, and I'll answer the second part first, and maybe it'll help clarify the difference between tier two and three and moving from one to the next.

So if you look at a solar home system companies that started out as just lighting companies and mobile charging companies, like _____ or Mobisol or Off-Grid Electric, not only are they offering larger and larger systems that can power a vast majority of household needs, really some of them reaching about tier three already, but at a fairly high cost, grid comparatively expensive cost, but if you look at the lower end of the spectrum, Mobisol has a clothes iron that they can—that they sell with some of their—with their systems, and they can run ten laptops at the same time, because they have a great big 12 volt battery that's attached to their system.

So a lot of them are actually able to do tier three equivalent tasks for short periods of time, but one of the requirements of tier three is that you have access to it for a certain number of hours per day, which the battery storage side of these solar home systems don't necessarily offer the way that they are packaged now. There would be in my view a way very easily to bump these systems up. They just get more expensive. And the—it's a function on the one hand of hyper efficient appliances and the ability of rural consumers to pay for certain things, because the technology is there, of course, to put five kilowatts on the top of roofs, like they do in Europe and the United States, anywhere in the world.

But it's a question of what can people afford and what are these systems designed to do, based on the affordability and the needs requirements that these companies see, combined with what can they get to these consumers cheaply and easily. And so I think it's partially logistics, it's partially technology, and it's partially a kind of aspirational question. But the means to do this transition are already there. And so I think that our paper hopefully is going to urge people on the low end of the spectrum to aim higher, and people on the high end of the spectrum to bring the costs down, and to try to kind of work towards this global middle of the road point that we were saying should be the aspirational goal of tier three for everyone. Sorry if that was a little bit vague, but hopefully, that got to the point in a way.

Eric No, no. That was great, and I think quite helpful. So we're unfortunately out of time. As I said, we'll reach out to attendees that asked questions that we didn't have an opportunity to get to offline. But before we turn to the survey, I wanted to just offer panelists an opportunity to make any closing remarks.

Aaron Our only closing remark is to say thank you for all the great participation from the panelists and the great questions. And we're available to answer further questions and comments offline. And we're probably going to be holding a second webinar that's more friendly for people in the Americas time zones. We realize that you all had to wake up very early for this, so thank you so much.

And especially to our organizers, who had to wake up the earliest, I think, so thank you so much, Sean, and to everyone on your side. Lucy, did you have anything else? No? Okay. So with that, yeah, we'll hand it back to you and say thanks once more.

Eric

Okay. Great. Thank you very much. Thank you again to all the panelists. Those were fantastic presentations, very informative. We'd like to now ask our audience to take a minute to answer a quick survey on the webinar. We have five short questions for you to answer, and the feedback is very valuable to us, so let us know what we're doing well and where we can improve.

The first question is the webinar content provided me with useful information and insight. The next one is the webinar's presenters were effective. Overall, the webinar met my expectations. Do you anticipate using the information presented in this webinar directly in your work and/or organization? And finally, do you anticipate applying the information presented to develop or revise policies or programs in your country of focus? Thank you for answering our survey.

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 had a great audience, and we very much appreciate your time.

I invite our attendees to check the Solutions Center website if you'd like to view the slides and listen to a recording of today's presentation, as well as previously held webinars. Additionally, you will find information on upcoming webinars and other training events. We are now posting webinar recordings to the Clean Energy Solutions Center YouTube channel. Please allow for about one week for that audio recording to be posted.

We also invite you to inform your colleagues and those in your networks about Solutions Center resources and services, including no cost policy support. Have a great rest of your day, and we hope to see you again at future Clean Energy Solutions Center events. This concludes our webinar.