CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

Promoting High-performing Off-grid Appliances: Opportunities for Policymakers

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Webinar Panelists

Charles Diarra	ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)
Nickson Bukachi	Kenya Energy Regulatory Commission
Ari Reeves	CLASP
Naomi Wagura	CLASP

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Kamyria Coney — Hello, everyone. I'm Kamyria Coney, and welcome to today's webinar, which is hosted by the Clean Energy Solutions Center, in partnership with _____. Today's webinar is focused on promoting high-performing off-grid appliances opportunities for policymakers. 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 may use to dial in. If anyone is having technical difficulties with the webinar, you may contact the go-to webinar's help desk at 888-259-3826 for assistance. If you'd like to ask a question, we ask that you use the questions pane, where you may type in your question. _____ _____ having difficulties viewing the materials, we will be posting PDF copies of the presentations on the Clean Energy Solutions training page, after the presentation.

The audio recording and presentations will be posted on the training page within a few days of the broadcast. And will also be added to the Solutions Center YouTube channel, where you'll be able to 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: the Clean Energy Solutions Center does not endorse or

recommend specific products or services. The information provided in this webinar is featured in the Solutions Center's resource library, as one of many best practice resources reviewed and selected by technical experts.

Today's webinar agenda is centered around the presentations from Naomi Wagura, and our guest panelists Charles Diarra and Nickson Bukachi, who have joined us to discuss on how policymakers can use test methods, quality standards, and labeling to promote high-performing off-grid appropriate appliances. Before we jump into the presentations, I will provide a quick overview of the Clean Energy Solutions Center. Then, following the panelists' presentations, we will have a question-and-answer session, where the panelists will address questions submitted by the audience. At the end of the webinar, you will be automatically prompted to fill out a brief survey, as well. So thank you, in advance, for taking a moment to respond.

The Solutions Center was launched in 2011, under the Clean Energy Ministerial. The Clean Energy Ministerial is a high-level global forum to promote policy and programs that advance clean energy technology, to share lessons learned and best practices, to encourage the transition to global clean energy economies. Twenty-four countries in the European Commission are members contributing 90 percent of clean energy investments, and responsible for 75 percent of global greenhouse gas emissions. This webinar is provided by the Clean Energy Solutions Center, which is an initiative of the Clean Energy Ministerial. The Solutions Center focuses on helping government policymakers design and adopt policy and programs that support the deployment of clean energy technologies.

This is accomplished through access to no-cost expert policy assistance, and capacity-building activities such as this webinar. The Clean Energy Solutions Center is cosponsored by governments of Australia and the United States. The Solutions Center provides several clean energy policy programs and services. This includes a team of over 60 global experts that can provide remote and in-person technical assistance for governments and government-supported institutions, a no-cost virtual webinar training on a variety of clean energy topics, partnerships building with the development agencies and regional and global organizations to deliver support, and an online library containing over 3,500 clean energy-policy-related publications, tools, videos, and other resources.

Our primary audience is made up of energy policymakers, analysts from governments and technical organizations in all countries, but we also strive to engage with private sector NGOs and civil society. The Solutions Center is an international initiative that works with more than 35 international partners across a suite of different programs. Several of the partners are listed above, and include research organizations like IRENA and the IEA, programs like SEforALL, and regionally-focused entities such as ECOWAS Centre for Renewable Energy and Energy Efficiency. A marquee features that the Solutions Center provides is the no-cost expert policy assistance, known as the "Ask an Expert." The Ask an Expert service matches policymakers with

more than 60 global experts selected as authoritative leaders on specific clean energy finance and policy topics.

Again, this _____ is provided free of charge, and if you have any questions for our experts, please submit them to 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 briefs introductions.

Mr. Ari Reeves is a senior manager with CLASP, where he leads Lighting Global Quality Assurance, a program focused on identifying and promoting high-quality distributed solar energy projects. Mr. Reeves also has more than ten years of experience working with public and private sector players in countries all around the world.

Next up is Naomi Wagura. Naomi is a senior associate working in CLASP's east Africa office in Nairobi. Naomi is the CLASP policy engagement in the east African region. In addition, Naomi has worked with the east and southern African region for more than five years, in both the off-grid and on-grid energy sectors.

At this time, I'm going to hand this over to Naomi for her presentation, and then we will hand it over to Ari, so he can introduce our panelists for today.

Naomi Wagura Hello, everyone, this is Naomi Wagura from CLASP. I should have my slides up in just a minute, so that you can all see them, just a second. So, we're going to give an introduction to the policy brief _____ the Efficiency for Access Coalition _____ [glitch interferes with audio] go through that, and the recommendations that are in that policy brief.

So, this policy brief was produced by CLASP and the Energy Savings Trust, on behalf of the Efficiency for Access Coalition, which is a partnership [glitch interferes with audio] organizations working towards _____ clean energy access through super-efficient off- and weak-grid appliances. This brief was developed in consultation with a diverse group of stakeholders, and represents one of the vast efforts to synthesize policy options regulating of grid appliances. The documents _____ how test methods and policy standards [glitch interferes with audio] labeling programs might be used to promote high-quality and energy-efficient appliances in off- and weak-grid markets. So, [glitch interferes with audio]. So, the stakeholders that _____ involved in producing this policy brief include energy and petroleum regulatory authority in Kenya, the ECOWAS Centre for Renewable Energy and Energy Efficiency, ECREE, the East Africa Center of Excellence for Renewable and Energy Efficiency—Renewable [glitch interferes with audio], sorry.

So, what this does is—so, I'll just give an overview of what off-grid appliances—what—the context of off-grid appliances. So, high-performing DC appliances are being developed for use in off-grid settings, and these appliances have the potential to transform lives of people that live in off- and weak-grid settings. For example, the cooling, irrigation, and communications benefits of off-grid refrigerators _____ and televisions have the potential to

increase productivity, livelihoods, educational _____ _____ and health _____ _____ _____. Energy-efficient off-grid appliances enable energy access, by allowing customers with limited electrical supply—for example, _____ that are running on solar home systems—to run more appliances [glitch interferes with audio]. I just received a note that you can only see my notes and not my presentations, so sorry about that. [Laughs]

[Side conversation]

So, this slide gives [glitch interferes with audio] of the impact of using super-efficient appliances with solar home systems. This is from a report that the Efficiency for Access Coalition produced. So you can see that there is [audio cuts out] percent difference between using a solar home system with a conventional appliance and using a solar home system with a super-efficient appliance. So, in the policy brief, we explore a few tools for policymakers, so one of those tools that can be used are test methods. So, test methods are standardized methods that—they form the foundation for standards policies and programs.

They enable _____ measurement and comparison of products with different characteristics. So, for example, we have some IEC standards for _____ solar products and solar home system kits; that's the IEC test standard 6225795. [Glitch interferes with audio] provides test methods that have been developed by the Efficiency for Access Coalition. So, those can be accessed on the Global _____ website. It's another tool for policymakers that we explore in the policy brief [glitch interferes with audio] standards. So, there are two _____ of standards: we have voluntary standards and mandatory standards.

So, voluntary standards can establish the minimum performance [crosstalk].

[Side conversation]

So, move to the next slide, please? [Audio cuts out] standards? Thank you.

Okay, so, government standards and labeling initiatives are needed to promote quality and efficiency, as well as to protect consumers. So, standard _____ programs are operationally in more than 80 countries, and cover 50 different types of appliances and equipment. But most appliances and equipment that are covered by these standard and labeling programs are AC-powered. So, we have provided a case study on the important standards and labeling programs; the case study is under European Union, in the policy brief, that you can have a look at. So, looking specifically at the type of standards that we have, we have voluntary standards, which build on the test methods by establishing minimum performance requirements for areas such as durability, safety, _____ advertising, warranty.

And these voluntary standards can be used as a stepping stone to mandatory standards. They can also be used in market development initiatives, for example, if you want to run a _____ program or a consumer awareness campaign, then you can use voluntary standards to qualify products that can be involved in those initiatives. And then, after you develop voluntary

standards, you can then move on to mandatory standards, which are used to ensure that all products that are manufactured or imported into a country _____ _____ the minimum requirements. So, the benefits of mandatory standards can be significant, especially where you have a lot of poor-quality products in the market.

Ari, please move to the next slide.

So, another tool that policymakers can use in regulating appliance markets are labeling programs. So, labeling programs allow you to make comparisons between products. So this is what is visible to the consumers and business. They're not able to see the standards, because that is a document that is used for the government or whichever entity is implementing the standards, but the labeling is consumer-facing. So, _____ import standardization [glitch interferes with audio], for example, can be used to indicate that a product meets national standards. And in more mature markets, you can use _____ _____ label, for example, if you're familiar with the US market, we have the Energy Star label, which shows the highest-performing appliances in the market.

Next slide–

So, in summary, we have a few tools that we've discussed, the test methods, which provide impartial information. And then we have voluntary standards that can be used as a stepping stone to mandatory standards. And they can be used in consumer awareness campaigns to provide tax exemptions and so on. And then you have mandatory standards, which are sometimes called minimum energy performance standards or standards _____ _____ durability, safety, truth in advertising, and warranties. So, these standards are mandatory, and they can cover both conventional _____ _____ _____ of products. And these are used to eliminate the lowest-performing products from the market.

And then we have labeling programs, and this makes the information regarding performance visible to consumers and businesses that are purchasing the appliances. So, this would be used to raise the consumer awareness _____ product performance, and make it easier to identify the products that meet the standards, as part of the enforcement efforts.

Next slide, Ari?

So, there are a few considerations that you need to make before you implement standards and labeling programs, especially for off-grid appliances. So, you need to look at the market, first understand the market, to understand whether it's appropriate time to introduce standards. Because if you introduce standards too early, then you might end up having a negative impact on the market, and you might stifle the growth of the market. So, when the standards are developed, you need to develop them for specific appliances and end users, and these can be phased in over time, as the market reaches maturity. And so, labeling programs, governments should carefully consider whether the information and the comparison _____ _____ product is available.

Whether you're able to monitor the use of the label, and also campaigns to educate the consumer would need to be made. Because a label without consumer awareness is not very useful to the end user.

Next slide, please?

So, one of the recommendations that we make in the policy brief, on how to introduce some of the labeling programs for off-grid appliances, is that first _____ need _____ market research and stakeholder mapping [audio cuts out]. This would help you understand the market and the broader environment, and build the confidence in the proposed measures. So, the market research can reveal several important details. So, on the one side, the decision-makers should consider whether that technology is widely available and affordable, and whether there is demand for it, and the extent to which affordability is a barrier. Then on the supplier side, decision-makers should consider the number of products that can meet the standard, and the number of suppliers. So, a market assessment would help you understand the impact of the standards on the business _____, so you avoid unintended negative consequences.

Next slide, please?

So, another recommendation is to build on existing tools, and consider a regional approach. So, this recommendation concerns harmonizing test methods and standards in a region, for example. So when you harmonize your test methods and standards, then you lower the cost of testing and certification, and the overall cost for companies to comply with the standards and labeling requirements that you put in place. So, for example, if a company sells in the Kenyan, Tanzanian, and Ugandan market in east Africa, then when you have harmonized standards and labeling requirements, then the company will just need to test once, and then they're able to place their market in all three markets. As opposed to having bespoke standards in every country, and so they will have to test the products to conform to the standards in each market, which really raises the cost of compliance.

_____ also makes it less expensive than _____ compliance and identifying [glitch interferes with audio] on noncompliance products across markets. So, for example, in my example in east Africa, then the Ugandan government, for example, could share information on which products don't comply with the standards in Uganda. And share this information with the Tanzanian government, for them to take action with similar products in their market. And then, another point to consider is the country representatives of regional institutions are encouraged to push for new regional measures that build on existing test methods or standards. So, for example, the existing test methods at international test methods at international level either ISO or IEC, and so, aligning with these international test methods is encouraged.

And at the national level, decision-makers are encouraged to check whether an existing international regional or national test method or standard can meet their needs, before developing their own, given that it takes a lot of resources to develop test methods and standards than looking first _____ _____ _____

if there is already an existing test method or standard, that reduces costs of developing the standards. So, another recommendation is–

Sorry, Ari—next slide.

– developing a roadmap and engaging the stakeholders. So, from the stakeholder mapping, a government would have identified all the stakeholders that are involved in an industry. And so, you can then develop a roadmap search, and the stakeholders know exactly what is coming. So, for example, if you're going to introduce voluntary standards, let them know when the voluntary standards will be in effect, and what they need to do to comply with those voluntary standards. And then, when that voluntary standard will move to being a mandatory standard. So, [glitch interferes with audio] really helps the stakeholders to plan ahead, so that the regulations don't catch them by surprise.

And then, it also makes the policy and regulatory environment as predictable as possible. So, as an example that is provided in the policy brief, India used an energy efficiency roadmap to transform its _____ air-conditioning market. So, the BEE, the Bureau of Energy Efficiency, launched a voluntary policy for _____ _____ ACs, in 2006, that then became a mandatory policy in 2009. And then, the policy has been incrementally revised, so there were reversions in 2015 and 2018, and this was communicated to the stakeholders ahead of time, so that they knew, for example, in two years they would revise the standard for _____. So, this would be ideal if you were to introduce standards: just let the stakeholders or the companies or the people that have to comply with the standards know what is coming.

Next slide, please?

So, that's a brief of the policy brief, and this gives you a few links that you can access the policy brief on the website, and the SNL guidebook. So this is developed by CLASP, and it provides a very good overview of how to introduce some of the labeling programs, and gives examples of successful standards and labeling programs on the international—internationally. And then, we have the global _____ test methods and related reports, so these are on the Efficiency for Access website, and you can [glitch interferes with audio] access this online. And then, we have the _____ data websites, which publishes information on all the off-grid appliances that CLASP, under the Efficiency for Access Coalition, has tested. And this is provided free of charge.

And then you have the policy _____ on the CLASP website, which gives a summary of policy standards and labeling policies around the world. And then, we have—sorry, any questions that you have for us, you can send them to us in that e-mail address, at energyforaccess.org. So, that's it.

Thanks for listening, and if you have any questions, please let us know and we'll answer them. And apologies, again, for the technical hiccups at the beginning.

Kamyria Coney Awesome, thank you so much, Naomi. Ari, did you want to say a little bit about our panelists, or a little bit more about what Naomi just went over?

Ari Reeves Well, Kamyria, we're in the unfortunate position of our panelists having not shown up. So, one possibility—unless they're out there and they just haven't identified themselves, yet. So, Nickson, Charles, are either of you calling in, by chance? Raise your hand or touch something in the chat, if you are. The other thing we could do is we could open it up for questions from participants, and [crosstalk].

Kamyria Coney Yes, we do have a couple questions.

Ari Reeves And wait and see if our panelists show up. Another thing, it's just a little bit of a stretch, we could take volunteers from participants who are currently on the call, if anyone wants to be grilled about what's going on in their country with respect to policies related to off-grid appliances. [Crosstalk]

Kamyria Coney Yes, those are both great options.

Ari Reeves So, why don't we open it up for Q&A, and if anyone wants to volunteer, you can certainly promote people to presenters, right?

Kamyria Coney I could, yes.

[Side conversation]

So, I mean, at this time, please, anybody, if you have any questions or concerns, or you just have some—or any comments that you wanted to add, please add it to the questions pane on your screen—that would be great.

Ari Reeves Oh, great, looks like we have a volunteer: "I could share my experience in Tanzania," from Karim Albana. Kamyria, could you make Kareem a panelist?

[Side conversation]

Ari Reeves Thanks for joining us, and thank you for volunteering. The first question, then, I have for you is, what's going on in Tanzania with respect to—well, first, maybe you could just introduce yourself, and tell us what organization

Yes, yeah, I mean, hi, everyone, and thank you, Ari and Naomi, for giving me the floor. Yes, I'm not very experienced that much when it comes to professional experience, but I did my master's thesis in Tanzania, because my master's was studying solar energy, in Sweden. And we had this project through Engineers Without Borders, in Sweden; they had a school, _____ School, it was like a secondary school for girls in Tanzania, in rural area. And I went there because we had an off-grid PV system powering the whole school for 200 girls, and we had some technical issue, there. So, yeah, I mean, I can share my experience from this project, not talking about the whole of Tanzania, but specifically about this off-grid school.

So, yeah, I mean, does this meet the agenda? Or—

Kamyria Coney I mean, you can just, kind of how Ari was explaining, just talk about, like you said, just share your experiences on what you've been—pretty much what Ari just explained, and your experience, any suggestions, or how that's created any other opportunities, that kind of stuff. Anything you kind of just can share with us would be amazing.

Karim Albana Yes, yes, sure. As I said [crosstalk]–

Ari Reeves Yeah, hi, Karim, I'm back.

[Side conversation]

Karim Albana Yeah, I mean, as I said, we had this PV off-grid system, it was around five kilowatts. And the problem is, we had some power cuts in the PV system, and also, our battery bank suddenly started not to work anymore. And I went there to do my technical and my social research, and through a lot of calculations and also simulation software, I discovered that we were losing, actually, half of the electricity that were generated by this off-grid PV system. And the reason was that, this electricity was mainly powering LED lamps for the school, and besides some other loads such as a water pump. But the reactive energy consumed from these lamps were really high, up to, like, half of the energy was already lost.

And to make it simple and not very technical _____, reactive energy is something that is needed to power the loads, but it's actually kind of like lost or, like, useless. It's needed, but the less you have it, the more efficient you have your device. And so, as I said, we were losing half of this energy, and the conclusion was that we needed to replace the whole lightbulbs and the whole lighting system in the school. And that basically, the more efficient LED lamps, which were not actually present in this market, in this rural area, and we had to carry on discussions how we can bring more efficient lightbulbs, which was very basic needs for those people right there. And to bring _____ _____ local economy and a local market there.

And it might sound very simple problem, but it really affected the whole energy consumption in the whole school. Like, for example, sometimes we had the whole system shut down because of overload caused by this reactive energy, and then the students and those girls cannot study or continue their life [crosstalk].

Ari Reeves Karim, is there something that you see the government of Tanzania could do to help remedy the situation?

Karim Albana I'm actually an Egyptian, so I'm _____ African, but I live now in Germany. And I'm sure that even within the same country itself, I mean, we cannot standardize the whole situation in each country in Africa, or even within the same country. Like, if you have been to Africa, I mean, Africa is super large, and even in south Tanzania, every area has its own circumstances and conditions. And I'm not sure the role of the government how would it be, because I mainly focus my work on the bottom-up development. So, I rather focus on how to empower those local markets and local people, and then, the

policymakers, of course, can help with the _____ standardizing, and also not allowing those low-quality products to penetrate into the market.

Because those people are really vulnerable for climate change and for energy supply, and if they cannot afford it and then we—if they can barely afford it, and then they afford low-quality products and they lose half of this energy, it's really bad situation, and it's a loss of a lot of resources. So, in my opinion, we were developing the idea that how we can help those markets and empower the local people, to have those high-quality—I mean, I don't want to say high-quality, because in Europe this is, like, normal quality, I mean, but if we can say that more efficient devices into a local market. And the second _____ that I would also mention that, it was really important, as well, that we can move electricity from only consumption, which is mainly light, in this case, into rather than into empowerment and economy, fostering the economy through, for example, DC welding machines. Like, we need more appliances that are much more compatible with solar energy systems and PV systems, that can actually empower them to make profits. Because once they are able to make profits from using renewable energy systems, then we can achieve sustainable development. But keeping depending on donations to only power some lightbulbs, yeah, I mean, we can't beat around it.

Ari Reeves Thanks for your comments, Karim—really appreciate it.

Jeremy volunteered to offer a perspective on the topic of standards and labels for off-grid products. And I wonder, Kamyria, could you promote Jeremy to a presenter or a panelist?

[Side conversation]

Jeremy Tate Hi, yeah, this is Jeremy Tate. [Crosstalk] Yeah, just a quick word of introduction, yeah, I've been pleased to be working with the Efficiency for Access Coalition over the past year or so, helping to work with quite a large group of stakeholders from the sector, to develop a technology roadmap for off-grid and weak-grid refrigerators. Looking at the current market for refrigerators in off-grid and weak-grid, and trying to work out what the technology needs might be for growing that market in the future. But during that process, we came across an awful lot of nontechnology issues and barriers that would also need to be addressed, and some of those are quite interesting. But on the particular topics you've been talking about in the introductory presentation, some interesting things came to my mind, having looked at the situation for refrigerators.

And I think the situation for refrigerators is going to be a different _____ the situation for lamps and fans and charging equipment, which is already fairly well-established. In the off-grid area, refrigerators are very new. And, you know, I've got some suggestions for discussion, really, because one of the issues we came across was the need, in terms of performance of refrigerators in the off-grid market, don't really coincide entirely with the needs for on-grid conventional refrigerators in advanced economies. And a couple of the areas that were particularly different were on repairability for, one significant aspect, and the whole durability of the appliance, operating in harsh

conditions, high ambient temperatures, high humidities, often. And in terms of repairability, that's particularly important, to make the financing work.

They represent a very substantial investment for the user, whether it's a business, particularly if it's a household. And so, these appliances would have to last longer than the financing plan that makes it possible to buy them. And the robustness and durability of conventional appliances, particularly very cheap appliances that are used in many other parts of the world, simply may not be appropriate to these markets. And so, the question is about when to intervene. And I do understand the potential problem of setting standards too early in a market, and, yeah, it could limit growth.

But what do our listeners think [laughs] about the need to establish market-appropriate appliances? And is there a risk of a market being flooded with products which are appropriate for an advanced economy off-grid, highly-affordable appliance, but may not be the best and most appropriate products for this other market? And another significant issue for refrigerators, that the stakeholders latched onto as we were looking at the specifications, was controllability. And a piece of refrigeration equipment represents a substantial load for a small off-grid system, particularly if it's a commercial appliance or if it's an icemaker, for example. And the appliance doesn't have to be powered all the time; it could be used in load management in the system.

And if that appliance is controllable by a central load management system, then it can be switched on and off as power is available. And it can help businesses to grow revenues, and therefore, businesses can afford to pay the higher power. So it's attractive, but it's a high load, it's a potentially troublesome load, if it's not fully controllable. And controllability is another aspect that I think is different to what you'd see in conventional appliances, the need for control through a network. So, there are some interesting differences between your conventional appliances and appliances that might be necessary for this market.

And so, I'm wondering, is it worth looking at making the case for earlier intervention, for setting standards very early in the market, to help steer the market in a direction, in a more sustainable direction, that's sustainable on the economic side but also on the environmental impact side? So, maybe some things that people may want to comment on, does that seem—is early intervention with standards and labeling actually appropriate, perhaps, for refrigerators, in the off-grid market? [Brief silence] I could say more about the technology roadmap, but I'll leave that there if that's [laughs]—if others would like to comment. [Brief silence] Have I lost connection?

[Side conversation]

Naomi Wagura Yeah, I'm just restraining myself from commenting, and giving everyone else a platform to say whatever might be on their mind. In terms of introducing standards really early in the market, 'cause for refrigerators it's a very, very new market, right, as opposed to—so that might stifle innovation _____ _____. But then, yeah, you don't want crap products getting to the market, and then trying to steer the market away from those crap products later on

once the market matures. So, [glitch interferes with audio] it'll be great to hear what everybody else thinks, apart from the Energy for Access [laughs] Coalition members.

Ari Reeves We also got a question, here, about how we developed the policy brief, and who we consulted with, and so on. Maybe I should just say a few words about that?

Kamyria Coney Sure, go ahead.

Ari Reeves Okay. So, we developed a policy brief, over the last four months or so, four or five months, and "we" was CLASP and the Energy Saving Trust, on behalf of the Efficiency for Access Coalition. And we developed it based on our knowledge of the policy space related to off-grid appliances, and based on our experience working with off-grid energy systems _____ solar products and SHF kits. And with such off-grid appliances as refrigerators, televisions, fans, and solar water pumps. And also, our collective experience with standards and labeling programs for on-grid appliances. We put together a draft and shared it with a number of stakeholders from different spheres, including a number of consultants, some government representatives, both at the country level and at the regional level.

We had very good participation from Charles Diarra from ECREE, and Nickson Bukachi from the Energy and Petroleum Regulatory Authority in Kenya, in particular. And that's why we invited them to serve as panelists, today. We also shared the draft with some development agencies that we know are working in this space. And really were able to improve the document a lot with all of their input, and produced the document that hopefully you've had a chance to see. If you haven't, it is available from the Efficiency for Access website, which is efficiencyforaccess.org, along with a number of other excellent resources, including the test methods and other items that—other resources that Naomi went through, a little while back.

And let's see what else we have, here. We got a question: "Could you share more on the different roles that you see for voluntary and mandatory standards, the pros and cons of each, especially the dangers of mandatory standards?" Naomi, do you want to get started on that, on answering that one?

Naomi Wagura Could you repeat the question again, Ari? Sorry.

Ari Reeves The question was, could you share more on the different roles that you see for voluntary and mandatory standards, especially [crosstalk] dangers of mandatory standards, which you've just touched on with Jeremy a few minutes ago, also.

Naomi Wagura Yeah, so, yeah, I'll quickly go through that again, and maybe a bit slower, this time. [Laughs] So, for voluntary standards, for example, if you are familiar with the Lighting Global Quality Assurance Program. So, those _____ have been considered voluntary standards in a lot of the economies, and they were used by a lot of nongovernmental organizations, and some governments. So, for example, if you want to set up a tax exemption scheme for the most

efficient, for example, or the best performing off-grid refrigerators, then you might want to set a standard such that only the products that meet that standard can apply for the tax exemption. But it's still a voluntary standard in the sense that it's not required for all products coming into the country to meet that standard.

So that's one of the ways that you can use a voluntary standard. And it also helps prepare the way and the industry and the market for upcoming mandatory standards, if you're able to introduce mandatory standards later on. So, it gives you time for the industry, for the market, to interact with what you're proposing, before it becomes a mandatory standard. And it can also be used for other market development initiatives like _____ procurement. So, for example, if a government wanted to transform the off-grid solar water pumping market, for example, so they wanted to increase the _____ of solar water pumping technology in their country, then they could set up a bulk procurement program.

Where, for example, this—there's a bulk procurement program in India, where the government has set certain requirements for products that can be included in the bulk procurement program. And so, those standards, if a [glitch interferes with audio] meets that standard, then it can benefit from the bulk procurement program set by the government. So those are just examples of ways that you can use a voluntary standard, and then at the same time, you're also testing how applicable is the standard to your market, is it time, yet, to introduce a mandatory standard. So then you move to a mandatory standard, for example, once you feel that the market's mature enough, once you engage with the stakeholders enough for them to have understood what the standard covers, how to meet it, what are the requirements and so on. And the mandatory standard then eliminates the first quality or the first performing products from the market.

So, those would be the two distinct differences between a voluntary standard versus a mandatory standard. Ari, do you have anything else to add?

Ari Reeves

I think that's good. I would also just kind of emphasize that any standard, whether voluntary or mandatory, sends a signal to manufacturers about what's expected of them in terms of product design. And, so, it's kind of about the strength of the signal [laughs], and if, you know, once you move to adopting a mandatory standard, then, you know, that's a requirement that is incumbent on all products that wish to be marketed in a different jurisdiction. And so, at that point, you know, it's quite clear, "This is what's required." But even with the voluntary standard, you can do quite a lot to make it clear that this is what's expected in general, but then offer a little bit more flexibility in terms of so as not to stifle further product innovation, and so on.

I also wanted to comment on, in response to a question about regional versus national standards that we received, I just wanted to make it clear that, well, in my mind, I don't think of it as an either/or type of thing, you know, either you have regional standards or you have national standards. Ideally, the regional standards and national standards would be aligned with one another, and they serve different purposes. I can explain a little bit; I'm sure there are

others on the phone who know this domain much better than I do. But in west Africa, for example, the ECOWAS Centre for Renewable Energy and Energy Efficiency has a mandate to consider and put forth standards at the regional level, or for adoption at the regional level. And these standards, once adopted by ECOWAS, serve as a model, essentially, for the member countries within the ECOWAS region, to adopt at the national level. So, in that way, the regional and national level standards kind of complement each other.

Because the actual—any kind of enforcement actions, market monitoring enforcement action is necessarily taken at the country level. But the regional level body can serve a kind of coordinating function, and provide a template for the countries to then adopt and run with.

Oh, here's a question about—let's see: "Assuming the necessary preconditions are in place, how would you begin developing standards for off-grid appliances?" That's a very good question. We have some guidance on that point, in the policy brief. I think that one thing that we like to encourage people who are interested in adopting standards to do is to reach out and contact the Efficiency for Access Coalition. And you can do so either by contacting one of us after this, or through the Efficiency for Access website—we have a form for getting in touch with the coalition. And the reason that that would be helpful is because, one of the things that the coalition is exploring right now is the need for standards for off-grid-appropriate appliances.

And it's really critical that we hear from people out in the world who could make use of these standards. We want to find out if there are governments that are interested in developing standards, and for what purposes. And then, we can serve a kind of coordinating—serve as a coordinating body to help bring together folks from different places, and learn from each other, and figure out what appropriate standards would be for specific off-grid appliances. So, I think the first step is to reach out and try to get connected with others who are doing the same, because as you heard earlier, there are real benefits to aligning approaches to evaluating appliances across geographies. And that goes both for the test methods that are used to test the products and also for any standards that are used to evaluate the results from those tests.

Any other questions that you see coming in, Naomi, [glitch interferes with audio]?

Kamyria Coney Did we mention the—I guess we did touch on everything. It looks like Jeremy might've—said that he had another comment to add. Did we get to that? About encouraging and mandating, to making available [glitch interferes with audio] information?

Ari Reeves Yeah, let's invite Jeremy to go ahead and make that comment over the line. Go ahead?

[Side conversation]

Nickson, could you start out by—we've kind of done things out of order, so we—Naomi did her presentation, and we had some Q&A. And now I have some questions I'd like you to respond to, if that's okay?

[Side conversation]

Naomi Wagura So, Jeremy, the question that I had for you is, having looked at the off-grid refrigerator market, as you have in the products, how fast is the innovation happening? Because one of the things that would end up happening is that country or region starts developing standards for off-grid products, off-grid refrigerators, for example, [glitch interferes with audio] with the standards developing process, that standard [glitch interferes with audio] obsolete because the innovation has moved past whatever the minimum requirements were put in the standard. So how fast do you see that innovation happening?

Jeremy Tate [Laughs] Yes, to be honest, I wish we had a better picture of that. But from what we've heard so far, it seems that innovation of products for this particular market, it is not happening very fast, because of the economic constraints that the suppliers are working under. I mean, there are some very, very clever systems, there are some very clever manufacturers who are tailoring and developing appliances that are suitable. But the traction that they're getting in the market is really quite limited, so far, because of the economic challenges, here. And it seemed that the only way that—or the main route that seems open to exploit, in the near future, seems to be where the appliances are used for, you know, productive use.

So, it's earning revenue for a small business, whether it's a café, a shop, a restaurant, a dairy, a small farm, et cetera. Where it's contributing to the revenues of that business, that's where we can see some progress possible. And there's been a lot of innovation in terms of refrigeration, making it work very efficiently, very well off-grid, very reliably off-grid for the vaccine market. But the economics of that are so different to the—even a commercial market, and certainly for a—in terms of a household market. The value of these off-grid appliances used for vaccines are two or three orders of magnitude higher than could be afforded by many of the very small businesses that we're looking at in terms of growing a mass market.

So, I think [glitch interferes with audio] many of the technologies are out there; they're not being applied to this particular market, yet, due to the economic constraints. And I think there are a number of specific technical barriers where innovation is needed, which I've identified in the roadmap. And one of those is actually availability of high-efficiency compressors, refrigeration compressors, in sufficient quantities, at the right price point, and with the right controllability. To really help the appliance suppliers, the system providers, to—to get them the tools to really get on and do their job. So, compressor technology was one of the areas that I think there is a need for focus, and that's why it was presented as a priority in the recent call for R&D grants.

And, yeah, we're hoping to get more focus from some of the compressor manufacturers in that. And the controls area is another one where there's the

need for innovation, and there's a good project, which has started now, led by Solaris, I believe—that's one of the R&D grant programs kicked off from the first call. And that is looking at developing an open source control protocol for, as I understand it, energy supply networks, so, communication between devices. And that's exactly the sort of control protocols that will be needed to be able to switch off your icemaker at times when everybody else needs the power for their TVs, their lights, fans, whatever. And then switch it back on as soon as the power is available to keep those high-demand appliances running.

So, yeah, I think economics is holding it back, but there are some very good innovators out there, there are some very good technologies already well-established in other markets, that could be transferred. But there are some very specific things for this market, which I think we can focus on in the programs, to try and make sure they're delivered. So, yes, very hopeful that we can help bring the marketplace together, to move this forward.

Naomi Wagura Thanks, Jeremy.

I don't think we have Nickson [glitch interferes with audio] on the line.

[Side conversation]

Ari Reeves So, we did things a little out of order; we started with a presentation of the policy brief [glitch interferes with audio] Naomi, and we did a Q&A. And, unfortunately, Charles Diarra wasn't able to join us, so you're our panelist. And we'd love to hear from you, so I have a few questions. I wanted to first start out with introducing you, and hearing about what your organization's doing related to the promotion of high-quality efficient appliances. So first off, Nickson, I understand you're the senior renewable energy officer at Kenya's Energy and Petroleum Regulatory Authority, formerly the Energy Regulatory Commission, ERC. Did I get that right?

Nickson Bukachi Yes, that's right.

Ari Reeves Okay, so far so good. So, tell us a little bit about what the ERC has been doing relative to off-grid appliances.

Nickson Bukachi Basically, now, we do promote, we do regulate the energy space, that's including off-grid solar systems, that's the installation. But when they are planned specifically, we are now looking at doing standards for some of those appliances, and we're having them captured in the regulations.

Ari Reeves Which appliances, in particular?

Nickson Bukachi Hello?

[Side conversation]

For example, we have MEPS, minimum energy performance standards, for refrigerating appliances [glitch interferes with audio] to apply across,

provided the refrigerator has an AC input. So, if a refrigerator has only DC, then in that case, we don't regulate. But if it has AC and DC, then we require that _____ be tested for _____ energy performance, using the Kenyan standard that has already been put in place. We also are working to develop standards for LED TVs, _____ _____ _____ MEPS. Yeah, so those are some of the _____ _____ _____ doing now.

Ari Reeves So, you said you have MEPS for refrigerators, for AC refrigerators, and if it takes both an AC—if a unit takes both an AC or a DC input, then it's also subject to the same requirements.

Nickson Bukachi Yeah, unless it's just taking DC. But if it has both inputs, then it's supposed to be taken through the MEPS [glitch interferes with audio] program.

Ari Reeves And you anticipate the television MEPS will be designed the same way [crosstalk] the only TV which would not be subject to the MEPS like DC or AC would be?

Nickson Bukachi Yes, that's correct, and also LED lights.

Ari Reeves Okay, interesting. Is ERC considering any measures for products that are specifically designed for off-grid use?

Nickson Bukachi Which products specifically?

Ari Reeves So, that would be a fan or a television or a solar water pump, maybe, or anything else that's designed specifically for use in an off-grid setting, as part of a solar energy system.

Nickson Bukachi [Crosstalk] For us, we look at [crosstalk] the technology, so whether DC or AC, if you have MEPS for LED lights, then it will include this.

Ari Reeves You said you have MEPS for LED lights—what was the last part?

Nickson Bukachi Yeah, we are in the process of developing standards for LED lights. So these lights [crosstalk].

Ari Reeves And those would be both AC and DC powered?

Nickson Bukachi Yes.

Ari Reeves Okay, interesting. And what are your thoughts about regional standards and national standards, and the roles of regional bodies in relation to developing standards?

Nickson Bukachi I think developing standards per country, at times, it's easier in terms of the process. But it's easier in implementation when the standards are adopted across the region. So, in most cases, it's good to start with a case study maybe for one country, then maybe convince the other member states to adopt their standards across the region. For example, for Kenya, maybe it would be good if MEPS is adopted by our neighbors—that's Tanzania, and Uganda, southern

Sudan, Somalia—so that we do away with the black market, where people could import goods to a neighboring country and smuggle them into a country where we have the minimum energy performance standards. So, in the process of development, having MEPS for a country's easier, for a start, than having it for a region, 'cause then you have to do a lot of agreements and discussions. But once you have for a country, then you can adopt across the region. So that would be my comment.

Ari Reeves Are you aware of efforts at the regional level, in the east African community, right now, related to MEPS for appliances?

Nickson Bukachi For off-grid appliances or for any appliance?

Ari Reeves Or on-grid, thinking that if there are activities related to MEPS or standards for on-grid appliances, that could serve as a model for similar efforts in the future related to off-grid.

Nickson Bukachi We have an association of regulators across the region, and in our meetings we have been trained to engage them, so that they adopt the minimum energy performance, or the energy performance standards for in the other countries. But I am aware Uganda was trying to do their own standards, _____ they tried the program earlier than Kenya. But for us, it has been able to move forward compared to the other countries. But in the last financial year, we're trying to identify some of the regulations that we have, which are not in our neighboring countries, and also, which they have that we don't have. And one of their standards that was being looked at was the minimum _____ _____ standards and labeling program for the other countries. So, we are trying to engage them to see if they could be able to adopt the standards across the region.

Ari Reeves Fascinating. And if you were to—well, I'll come back to the regional level activity in a moment. So, you explained that the MEPS that ERC develops for appliances apply to those that take power either from AC alone or AC and DC. Has ERC looked at the possibility of developing measures for off-grid appliances specifically? That is, perhaps, that might be products [glitch interferes with audio] that only accept DC power. And if so, why? If not, why?

Nickson Bukachi Pardon the question, sorry, someone interrupted.

[Side conversation]

Ari Reeves My question as whether the ERC has looked at the possibility of creating MEPS or setting standards of some kind for off-grid appliances. I guess that would be appliances that are powered by DC _____? Is that not within your mandate, or it's just not something that you've looked at?

Nickson Bukachi For a mandate to do regulation _____ _____ existing standards that we try and engage the standards body, whenever we feel this need to develop standards that are specifically targeting even appliances. But at the moment, I don't think there's been that critical mass to just develop standards for the off-

grid, the DC appliances alone. Because what usually happens, you have to look at the market, the size of the market, before you even develop the standards or the regulations for that [glitch interferes with audio] specific regulations. There could be some standards maybe _____, but not on energy performance. But once the market is big enough, then you can look at developing minimum energy performance standards for those appliances.

So, as of now, I don't think there's been that critical mass for developing a regulation to enforce MEPS for the off-grid appliances. Mostly now, the standards what we will be looking at is the quality of the appliances, which I'm aware they have some of the standards for that.

Ari Reeves And what—is there a specific trigger? Is there a regular review, to determine which products, you know, for which products ERC will develop MEPS?

Nickson Bukachi Mostly, it's informed by—we do a study, because ideally, the minimum energy performance standards are targeted to several given amount of energy. So, when you are doing MEPS, you then identify those appliances that will have the most significant impact in terms of _____ consumption. So, if you have maybe ten percent of the energy consumption going to a given appliance, compared to the others, then we would say it's significant for you to be able to develop a MEPS for that appliance. But for as long as the consumption is most significant, meaning, you cannot realize much savings by having some minimum energy performance standards, then it doesn't really warrant you to develop the program for that appliance. For instance, before we did for the [glitch interferes with audio] and refrigerators, there was a study that established most of the local consumers, "Do you use refrigerators? Do you use lights? Do you use air-conditioners and motors?"

So, with that, then we are able to develop MEPS for those appliances. Then over time, there has been needed to develop MEPS for LED TVs and also LED lights, because then the update is also a bit high compared to the other energy-consuming appliances. So mostly, it's a critical mass in terms of the appliances themselves, how much they will contribute to energy savings, before you _____ develop standards for that. But in case the plans does not warrant significant savings, then we just do the normal performance standards for the appliance, not necessarily the minimum energy performance.

Ari Reeves Hm—so there isn't another criterion about protecting consumers from poor-quality products, that focuses, really, on energy savings and limiting the growth of energy consumption.

Nickson Bukachi At the moment, what we are—I think there's a standard for _____ off-grid _____—it's not specifically on energy, but it's the quality of the product, maybe for solar lights. Because they are looking at first on the quality and [glitch interferes with audio] significant, before you now do minimum energies performance standards, depending on the amount of savings that you realize. For instance, you may not invest in a program where you will save—the amount that you are going to save is less than what you would put to have the program up and running. Most of the time, that's the consideration, yes, because it's a process to have a standard, the minimum energy performance

standard in place, and even to enforce them is also a cost. So you have to look at the cost, the cost benefit analysis, before you take up the program for a given appliance.

Ari Reeves I know we need to wrap up in just a minute. I wanted to ask one question. There was some discussion, earlier, about information requirements, and the role of regulation in requiring manufacturers to be clear about how products perform, and put factual information on their products, really, to help end consumers as well as other market actors like distributors, and the regulatory authority to better understand what's on the market. Could you say a few words about the role of the MEPS in Kenya, in terms of kind of making information, good information about products available?

Nickson Bukachi Okay, but I think that could be enforced through the technical standards for the given appliance, maybe by requiring that some information is included on the _____. Because that is an easier way of informing the customers. However, in doing a full program that does not have a bearing on the energy savings _____ _____ in terms of cost benefit analysis.

Ari Reeves Ah, so, you're pointing to the possibility of a standard like a KEBS, a national standard developed by KEBS, and serving that purpose, without needing a regulation and a regulatory program, is that right?

Nickson Bukachi Yes.

Ari Reeves Okay, interesting.

Kamyria Coney We did have one question from the audience, real quick, if you don't mind answering that. It is: "What is the relationship between standard body and the regulatory body before a standard is developed?"

Nickson Bukachi [Glitch interferes with audio]

Kamyria Coney Yes, the relationship between a standard body and the regulatory body before the standard is developed.

Nickson Bukachi In this case, they work hand-in-hand, because the process of developing standards can be initiated by the players in the market, for instance. If they feel that there is need to develop a standard to do away with some standard products, or to meet some minimum performance requirements, then they would request for the standards to be developed. In some cases, the regulator can request the standards body to coordinate or they just coordinate the development of standards maybe for MEPS. For instance, we could feel the significant market enough to regulate the minimum energy performance of an appliance, and in that case, we will request the standards body to initiate the process for developing that. Because once they do the standards, then we will develop regulations to enforce the standard, and come up with mechanisms to ensure there is compliance.

Ari Reeves Thanks, Nickson.

And thank you for joining [glitch interferes with audio]. I think we've come to the [glitch interferes with audio].

Kamyria Coney

Yes, thank you so much, everybody, for joining, and all the audience for commenting. And if we didn't get to your question, we will send them out to the panelists and to our presenters that spoke today, and they will get back to you, individually, afterwards. But on behalf of the Clean Energy Solutions Center, I would 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, that there were some valuable insights that you may take back to your ministries, departments, or organizations. We also invite you to inform your colleagues and those in your networks about Solutions Center resources and services, including no-cost policy support through our _____ _____ 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 will _____ on upcoming webinars and other training events. We are now also posting webinar recordings to the Clean Energy Solutions Center YouTube channel. Please allow for about a week for the audio recording to be posted. Finally, I would like to kindly ask you to take a moment to complete the short survey that will appear when we conclude the webinar.

Please enjoy the rest of your day, and we hope to see you again at a future Clean Energy Solutions Center. This concludes our webinar.