

Switch On Episode 4: Off-Grid Energy Solutions Transcript

0:00:02.140

[Music]

0:00:06.080

Scott Tinker: Across the developing world, governments and utility companies are working to expand the grid to provide electricity the one billion people still don't have it. This is mostly happening in and around rapidly growing cities where populations are dense, and existing infrastructure can be extended. Still for many, often rural, customers, grid electricity is unavailable or unaffordable. They need off-grid energy solutions.

There are nearly three billion people today who still live with little or no energy, and what I want to know is how they'll finally get it.

So this is, sort of, what it was. That's the future.

I'm Scott Tinker and I study energy. Come with me around the world to meet people and communities as they 'Switch On'.

So you told me when we were driving here this morning you saw giraffes. In the Maasai territories of Kenya, I met with Isaiah, a Maasai tribesmen who's also a traveling salesman.

So we're standing under power lines right now, which I didn't expect.

0:01:29.119

Isaiah: Yeah, this was a government project, but there is no power supply to the community here. To take the electricity from this place to the homes there will take time. It will be a little bit costly.

0:01:42.960

ST: I asked Kenyan Energy Consultant Elsie Mbugua about the country's rural electrification efforts. The grid is really extending quickly.

What percentage of the country actually gets access to the grid now?

0:01:53.840

Elsie Mbugua: You know, depending on who you talk to you might be between the 50 and 70 percent range. That's significant from where we were even a decade ago.

0:02:02.719

ST: It's crazy

0:02:04.399

EM: Yeah, most of the grid passes through the, sort of, the central part of the country. I would say much of the northern part of the country and western parts of the country a lot more needs to be done. In many ways we have limited resources within government and so you have to be very thoughtful about where you're putting your money.

0:02:26.160

ST: Often this means that bringing electricity to the most remote areas becomes a lower priority.

Isaiah works for M-KOPA, a Kenyan company stepping in to provide electricity where the grid does not.

0:02:41.920

Isaiah: And they are listening to the M-KOPA Radio, and they are saying it's very good because it is portable and it has a very clear sound.

0:02:49.200

ST: That's perfect. And they get good reception here.

0:02:51.200

I: Yes, and they get the news of what is happening all over the world. As well, they have the light, so they light the house. They have kids who go to school. So the light is helping the kids do their homework in the evening.

0:03:02.400

ST: Right. Isaiah, you were raised in this community.

0:03:05.120

I: Yes.

0:03:06.000

ST: You went to school here.

0:03:07.000

I: Yes.

0:03:08.319

ST: Did you have any electricity in school or home?

0:03:10.800

I: Not at all. No we didn't have any.

0:03:13.360

ST: So this is really changing lives?

0:03:14.800

I: This one is automatically changing our life and it is putting us to another standard.

0:03:19.519

ST: Yeah, that's interesting.

0:03:22.400

EM: What we're currently seeing at the moment is there's a significant number of startups. Young very bright entrepreneurs who've come to resolve and actually get people who are not connected to the grid access to power.

0:03:37.840

ST: Companies like M-KOPA hire young locals who know the area culture and language to sell home solar systems. Isaiah and I were here to install it.

Nice to meet you. Well we should probably get started. We got the kit.

These home solar systems consist of a battery that's powered by a small solar panel on the roof. It can charge a portable radio, flashlight, or cell phone, run some low wattage LEDs in the house. Even run a very efficient TV.

In Nairobi, I met with M-KOPA's Director of Marketing, Pauline Githugu.

0:04:27.120

Pauline Githugu: We have about 200 staff who are within the call center.

0:04:31.440

ST: 200.

0:04:34.000

PG: Yeah, and the basic activity here is to support our customers, making sure he knows that it's you know on credit. He knows how to pay for it, and then we switch it on.

0:04:43.280

ST: Young people.

0:04:47.280

PG: Yes, I'd say our average age here is probably 28 maybe even younger within the call center. The payment for this is done by mobile money.

0:04:59.120

ST: So that comes through a mobile network?

0:05:02.400

PG: Yes, that comes through a mobile network. So this device has a SIM card, so it operates like a mobile phone. Say I want to pay 50 cents today. I'll go to the phone and I will pay M-KOPA, okay? And once it recognizes that, M-KOPA sends a message to the customer on this device that you now have one day of credit.

0:05:25.600

ST: So there's mobile technology that's allowing all of this transaction to happen.

0:05:30.000

PG: Absolutely. Yes, yes.

0:05:34.960

I: Hello, so I can activate it now. Okay.

0:05:43.120

ST: Showtime. So we count to three. Three, two, one.

0:06:02.400

I: You think that it is very good?

0:06:05.400

ST: Oh yes. Congratulations.

0:06:06.720

I: They are very happy.

0:06:08.960

ST: Wonderful. This doesn't look like something I want to drink, Pauline.

0:06:20.080

PG: No it's not, so these are a representation of just how much kerosene a family would use if they were not using a M-KOPA device. So these are 365 bottles, which is just about about the same amount of time a customer needs to pay off for one of our products. So you can imagine this is all they inhale for close to a year and for many years.

0:06:44.160

ST: Right. They had to spend money on this too.

0:06:45.759

PG: Yes, so it's actually a displacement product. So instead of paying for this, then you now pay for clean energy that you eventually own and don't have to pay for at the end of it.

0:07:02.160

ST: So this is it. If you don't have the ability to use your phone and pay, you don't do this.

0:07:08.800

PG: No, you can't do this.

0:07:09.280

ST: This is the heart of this. Is this something that Kenya, M-KOPA, and others can share and export to the world?

0:07:18.479

PG: Absolutely! I think this is something that we've proved can really work, but it is really predicated on the existence of a good mobile network.

0:07:30.880

EM: It's phenomenal that you have technology that allows people who did not have access to financial services to finally be able to pay for their goods. That's a game changer. That means kids can actually study in areas where that would not have been possible before. It's sort of the dynamic. It's a domino effect that that touches on every aspect of people's lives.

0:07:59.039

ST: These home solar systems won't run a stove or refrigerator, but they bring light for reading and connection to the outside world to change lives at a cost that off-grid customers can afford.

And cost is a significant concern. Though the grid already reaches this rural neighborhood outside Nairobi, farmer John Cadenda has found an energy solution that works better for his finances and needs.

0:08:23.120

John Kidenda: And then I have the tomatoes, which requires a lot of attention.

0:08:27.520

ST: Would all of this grow with natural rainfall or do you have to use more water?

0:08:32.800

JK: Nothing. You get nothing.

0:08:35.440

ST: Really, it wouldn't grow at all?

0:08:37.039

JK: You know the next rain we expect here is in March.

0:08:40.640

ST: It's January now.

0:08:43.760

JK: We are in January.

0:08:46.160

ST: So you have to irrigate.

0:08:48.160

JK: I have to irrigate.

0:08:49.200

ST: How does the water get from your system to the plants?

0:08:52.720

JK: I could get a solar system that has a pump that has solar power, and this being Sub-Saharan Africa that to me was key where I can just use the solar energy, which is available like 365 days

a year. I've been having the pump for the last four months and there's no single day I've not had sun.

0:09:11.440

ST: Really?

0:09:13.279

JK: I've never used an electric pump because what I do I have a tank and I just pump water to the tank. And if it's in the evening I want to do sprinkling, I just put on and it works.

0:09:26.720

ST: So you're pumping water to a tank

9:28.620

JK: Yes

0:09:29.360

ST: It's elevated, and then when you need it

0:09:30.399

JK: I just use it.

0:09:34.560

ST: You use gravity.

0:09:37.440

JK: Here we have the solar panel.

0:09:38.959

ST: What's the capacity of these?

0:09:40.100

JK: 80 watts each so total of 160 watts.

0:09:42.880

ST: What does a system like this cost?

0:09:46.480

JK: You give them a deposit of \$100, they supply you the equipment. So what you're supposed to do after that is you pay \$45 a month, for the next 12 months. And the system is all yours. And what I get from the farm, I can comfortably pay the \$45.

0:10:03.680

ST: Okay, so your costs are covered here by what you get every month.

0:10:06.800

JK: Comfortably, comfortably.

0:10:08.800

ST: That's fantastic.

Samir Ibrahim is the American-educated, Silicon Valley-style entrepreneur, who started SunCulture that built John's system.

0:10:17.519

Samir Ibrahim: Most farmers in Africa live off-grid, and they live in rural areas like this. They make up two-thirds of the workforce. Farmers make money in two ways- they either sell their crops, or they sell milk from their livestock. Both of those two things need water, but rain is unpredictable, undependable. It leaves them one bad rainy season away from being completely wiped out. Where most farmers use these buckets and they fill buckets up from a water source, which is either on their farm or nearby. And they fill it up with 20 liters of water.

0:10:47.279

ST: 50 pounds.

0:10:49.120

SI: And they're lugging it around for the domestic needs for their agriculture needs, and it's heavy. 70% of the of the farmers in Africa are women

0:10:58.880

ST: Yeah.

0:10:59.519

SI: Our farmers actually tell us that the woman of the household spends over 17 hours a week lifting weights for their livelihood.

0:11:06.560

ST: Yeah.

Whoa it's way down there.

0:11:12.720

JK: It's really deep. We hand dug it.

0:11:16.399

ST: So how deep is the water itself? It looks like the top of the water is at least 10 feet.

0:11:18.880

JK: It should be more than 50 feet deep the whole way

0:11:23.600

ST: 50 feet?

0:11:25.200

JK: 50 feet, yeah. So it's really deep.

0:11:27.920

ST: So you got a lot of water in here.

0:11:28.880

JK: I pump the whole day. I have the water all year round also.

0:11:31.519

ST: Wow.

0:11:31.920

JK: Initially I used to pull the water manually with a bucket and a rope. That was really tough.

0:11:41.440

ST: So can you do this without a well like this? Is it possible?

0:11:45.519

JK: To farm? No. If it's possible then you have to tell me the seasons. When you have the rinse, and you know what that means? You'll have it at the same time with everyone.

0:11:58.560

ST: Right.

0:11:59.440

JK: So the market you all meet at the market.

0:12:01.360

ST: Too much supply, no demand.

0:12:03.440

JK: Now I can just time when I want to plant or even harvest. I can play with the market- the demand and supply.

0:12:14.160

SI: In Africa, we have 60% of the world's unused farmable land.

0:12:17.360

ST: Of the world's unused?

0:12:19.519

SI: Of the world's unused farmable land. We're the only continent when we talk about water scarcity, it's not a physical water scarcity, it's an economic water scarcity. People just can't afford to pull the water up, so this is good for five acres, and most farmers here have just about two. When you think about selling water pumps, you have to be very careful to not over spec because we have precious resources underground.

0:12:43.760

JK: We are very food insecure, and the reason is we've not made farming profitable, and I think that's why the food production systems are failing in Africa. We don't have youth engaged in farming. The average age of the farmer is increasing. You find that up to 50 year olds are the ones doing the farming. You need to cut on overhead costs. One of it is the energy consumption like now, if you're using electricity or diesel to pump your water, definitely that would be very expensive. If you want to make the farming profitable, the youth will not walk away from it.

0:13:21.600

SI: Africa only contributes to about 15% of global agriculture output and is projected to import 100 billion dollars of food in the next 20 years. My dream is to prove this out in a way where we get dozens of companies doing this with hundreds of thousands, if not millions, of acres under irrigation, with modular energy management services and a system so that people can plug in

other appliances. And that people have the choice of what they do. I mean, we're very fortunate, we can choose what we do, when we use power, when we take a shower, when we watch TV. We want to give people that choice. We want to give people that freedom. I think it has to do with energy. I think it has to do with connectivity.

0:14:01.600

ST: Sure.

0:14:02.160

SI: But I think it's giving people the freedom to choose how they do, what they do, and when they do it. And I think that we can get there. Not only across Kenya, but across Africa and around the world. I think in five years, we'll have picked up steam.

0:14:15.920

JK: What I just do now, I just place it to a location I want it to pump and it's a simple setup.

0:14:24.959

ST: You just physically connect it in the pump? It starts when the sprinkler goes?

0:14:32.560

JK: Yes, Are you ready?

0:14:34.240

ST: I'm ready, yeah. Let's sprinkle. Yeah, I can hear it.

0:14:40.000

JK: There you have it.

0:14:43.279

ST: Wow, that's spraying! I mean, it's spraying far.

0:14:46.320

JK: Yes, and I think what would be good is for me to get four sprinklers at the same time.

0:14:50.880

ST: Now you're thinking big.

0:14:52.880

JK: Yes!

0:14:54.399

ST: Across the developing world, several things are coming together to make small solar energy systems possible. Inexpensive solar panels, LED lighting and small electronics and appliances that keep getting cheaper are more efficient. Mobile phones and electronic banking that allow payment of microloans, and tech startups that want to combine them to serve off-grid customers. Wherever there's plentiful sun, these things are making home solar systems affordable and available, and they'll help millions of people begin to experience the benefits of energy.

0:15:28.880

I: This is a very nice country today.

0:15:35.399

ST: Yeah, that's beautiful.