Bloomberg Invest: Focus on Africa

The Road to Green Energy

Mallika Kapur: Peter, Norman, welcome. Thanks for being with us. Now, you both have the same goal, really, which is to light up parts of Africa that don't have access to power. There are many swathes of the continent that still remain in darkness. You're both doing your bit to power up Africa, but doing it slightly differently. You are focusing on rural areas and small-scale industries, mainly residential homes. You said it very well, you're focusing on the forgotten middle on industries and commercial entities. The form you're doing is different. Peter, you're using biogas, right? Can you explain to us very briefly how that works and what you're doing?

Peter BenHur Nyeko: Awesome. Thank you very much. We basically get agricultural waste that no one needs, and that's usually burned. Rice husks, maize cobs, groundnut shells, coffee husks, we convert that into methane and hydrogen, which then goes into an engine and runs it, and that generates electricity. In a village of maybe a thousand homes, that can deliver between half a megawatt to two megawatts of electricity, which covers all the needs of such a village.

If such a village is, for example, miles and miles away from the grid, it becomes significantly cheaper to develop that mini-grid to industrial-scale than to connect that village to the grid. That's what we do. We deliver electricity that's affordable, grid-quality, at the same price as the grid, and we do that in Uganda at the moment.

Mallika: In Uganda at the moment, right?

Peter: Yes.

Mallika: Norman, tell me about you. You mainly focus on solar energy, is that right?

Norman Moyo: Yes, Mallika. It's basically we like to call it distributed energy or decentralized energy. Targeting, really, as you put it rightly, the forgotten middle. I call it the forgotten middle because there's a lot of heat at the IPP level, which is at utility stage and not necessarily a lot of light at the moment but a lot of heat. Then there is work that he does more in the rural part, but what drives the economies of Africa is the commercial and industrial players, the data centers, the big businesses.

Whether it's your commercial, whether it's your industries, the mines, the private schools, that, unfortunately, has started to suffer significantly in the continent because there is no more energy security. The grid is weak, wobbly, and struggling. Most of these players are beginning to fire up the generator and probably is the most expensive way to try to run your business using a generator. Yet, they've got a massive real estate on top of their roof, some have got a massive car park, which is I do and dump.

Our view of the world is let me show up, let me put panels on top of your roof, let me utilize your car park. If you've got a mind, you've got a massive real estate, then you've got this massive reactor in the sun called the sun in Africa and we can generate anything up to 20 megawatt and we can power the actual company. You

can also put storage solutions now, whether it's Tesla, even Tesla is available, whether it's you put a wind farm or a mini-hydro or wind, but you can literally allow every entity in Africa today to generate its own power and possibly even sell some of it to the grid. It's a different mindset that **[unintelligible 00:03:46]**.

Mallika: How does the costing compare to that from the grid?

Norman: As you know to date, solar is probably the cheapest source of energy much cheaper than the grid. If I was to throw in numbers, solar per kilowatt hour can range anything around US$0.07 right now if you're building a decent enough plant size. Your typical grid in Africa the correct pricing should be in the US$0.13 to US$0.15, correct price. I say so because there's a lot of subsidy which has also created problems. Your typical generator is anywhere in the US$0.24 per kilowatt hour.

Mallika: Much more expensive, of course.

Norman: Solar has to be our default go-to technology to resolve the energy crisis in Africa.

Mallika: Peter you also work on mini-grid, so you have two businesses. One is the biogas part but you also have co-founded Modularity Grid. Tell us a little bit about the work you do there. You are basically providing the technology to make mini-grids more efficient.

Peter: Indeed. We're actually quite grateful for the work of the UK government in places like Africa through Innovate UK. Mandulis and Modularity Grid working together with Imperial College actually did the industrial research and development of the digital mini-grid systems that we are now scaling up. What happens there is you have a portfolio of mini-grids. By working on the digital technologies that connect them all together, you're able to work with tens of thousands of sources of biomass feedstock to feed those mini-mini-grids in terms of waste to energy but also manage the distribution of that electricity to the households in a particular mini-mini-grid.

Working on it linking both the hardware and the software parts together, makes it very, very interesting and a lot more modern than what you'd expect to find anywhere in the world.

Mallika: When we were chatting yesterday, you came up with a very interesting analogy about the airplane and how that's almost the same thing as a mini African village. I'd love you to tell our audience what you mean by that.

Peter: Awesome. Think about this. I flew here on an Airbus A380. My background is in aerospace engineering. You find easily a few 100 seats each seat is got phone charging, it's got a television screen, and that's the same amount of electricity that you'll probably have used by a rural village home. When you have a village of about 500 homes and a mini-grid that connects them up together, that's the same amount of electricity that you'll probably have being used in an Airbus A380, or A350, or something like that.

It brings it home, for me, personally. It means if it can work in a rural village, if the technology we do develop in rural villages, with regards to remote monitoring of battery systems and having 24 hour a day electricity at the lowest cost, that technology can actually be brought back to Europe and enter the UK and then used out here to bring down the cost of energy as well.

Mallika: Yes, I thought that was a really interesting analogy. Norman, so who are your clients? Who are these people who are saying, "Yes, come and put the solar panels on my roof"?

Norman: I think as a start, we had to be pragmatic. My background and our background as a group, we're part of the Econet Group or today called Cassava Technologies. We come from the telecom space. 20 years ago, we had this crisis where you had a monopoly called the fixed-line operator, trying to find their way to make telecommunication available. It took 20 years to figure it out eventually, but we ended up recreating and rewriting the African continent in terms of telecoms and penetration of telecoms.

We learned something from them. One of the key things we learned is you need to focus on what we call the buffaloes versus the rabbits, the buffaloes that really can feed. In Africa, when you want to feed a family, and you're hunting, and there's a limping buffalo, and there's a rabbit, you don't spend energy chasing the rabbit, you bring the buffalo first, then you can start chasing the rabbit thereafter. We were very deliberate and says there's the top 500 corporates in Africa.

That's our sweet spot. If I mentioned the name, you know them, whether it's Unilever, Coca Cola, whether it's private schools, whether is clinics.

Mallika: The big guys.

Norman: The big guys. The second piece is the data centers and the telecom switching centers, then you've got telecom towers in Africa. Those are probably the key customers who can sign a 10 to a 20-year commitment that they'll buy power from us. It's a power lease agreement or a power purchase agreement. Their investment great. Those are the ones that we're starting with. I think eventually we will converge with what he's working on and what the grid is trying to do, and eventually we would have solved this crisis in Africa.

Mallika: There's a great question that's coming from the audience, and this one is for you Norman, in particular. Solar panels can't replace the grid though, right? Especially when there are clouds, rain, and in the evenings. Can you elaborate on the storage solutions and how much does that add to the cost of solar power?

Norman: I think I will throw the figures out there. Storage is a very interesting conversation, albeit very futuristic. It's changing particularly the lithium battery technology. The price is coming down a little bit slower than we prefer because the demand is high. Not only do we need storage lithium battery to power homes and businesses, we are also using it to power electric vehicles right now, so the demand is high.

If you start to see the crisis in energy right now, the increase in price of diesel, and every corporate in Africa having to fire up a generator, the conversation is becoming realistic that I can combine my solar to my battery, and I can actually deploy a solution. In one of our markets, we rolled out 500 Tesla Powerwalls in a very rural parts of Africa, but mostly to power telecom towers.

I could report today that I think after two and a half years, we've had zero theft of those Powerwalls.

Mallika: Really.

Norman: Don't tell anyone about it, of course. We might excite them.

Mallika: It's just a secret.

Norman: It's a secret, yes.

Mallika: It's amongst us.

Norman: Yes, but I think the technology is coming of age. The pricing is getting there. Unfortunately for storage, the price is increasing. We're now beginning to relook at biomass as an alternative way to also start to complement, but we have to look at technologies that are of what we call tier one technologies. That's what you need if you're going to sign a 15-year lease.

Mallika: Well, you have the right person to talk to, of course. Peter, storage, that's a really good point. Many grids have their own challenges as well. I'm curious, how hard is it to really understand how much energy is required by an individual household in a village? How do you gauge that and what do you do with the surplus energy that's created? How do you store that?

Peter: Thank you very much. Our mini-grids work with biomass covering the baseload and solar coming in to cover the peaks at daytime. Our average mini-grid size is, as I said, at least half a megawatt and up to two megawatts in Uganda. That's the range you're allowed to build a mini-grids to. What that means is the households, about a thousand of them or so in a mini-grid, will not use much electricity by day because most people are in the fields harvesting and planting and so on, but you have all the mills running by day.

Our main storage is actually dry storage of the actual biomass waste itself. What happens is most of the electricity is used for agriculture value addition, because the big corporates out there in terms of breweries, in terms of other food industries, global ones, have their supply chain in these villages. They need those products pre-processed to the right quality standards; dry, clean, et cetera. The electricity that we generate and that we deliver at that low cost enables industries to set up branches in these rural areas, enabling these communities to actually feed into the global marketplace.

That allows us to run around the clock with all the electricity actually being used around the clock. Even though the communities will only use the electricity in their homes in the evenings when they get back home, we can still keep everything running around the clock. Electric vehicles have come in handy, obviously, because

the price of diesel and petro shot up in most of these areas. We do have EVs moving farmers across from A to B, luxury ambulances, and so on and so forth, and some battery storage as a buffer because when you have your buffer where you've got your biomass and your solar going into that buffer, you can guarantee a uniform quality of electricity around the clock.

That buffer may only be one hour of a buffer, but it delivers better quality than the grid. We've even had now shopping malls moving from the nearby towns to the rural areas so that they can keep their fridges on 24 hours a day. It is quite exciting from that point of view. It's leading us now from our current 3 locations to developing 26 now across Uganda.

Mallika: In expansion mode.

Peter: We're launching the first 10 that have been funded this year next year and fundraising for the next 16.

Mallika: I want to talk to you quickly about payments. There seems to be a lot of innovation in the startup space with people coming up with innovative solutions to power up Africa, such as yourself, but the bottleneck seems to be in payments. How do you get your customers, in which, in many case, rural farmers, people who work in the fields? What's your payment model and how do you ensure that they don't default on their payments?

Peter: That's why we go for biomass because our payment model is linked to the rural farmers actually.

Mallika: How so?

Peter: Being in agriculture, we purchase agriculture waste. They get an income from that. Secondly, when they have access to low-cost electricity at grid price or below for ag processing, they're able to multiply their income even further because the big firms will buy their grain at triple the price if it's at the right quality standard. By us linking them to us that way, we know that they will have to have an income, but then in terms of how they do pay, they pay us cashless prepayment systems.

We've got prepaid meters in each home, in each business. They buy the units of kilowatt-hours they need to use. Every customer replaces that when they do need it. Also, we've also decided to bring in all the mothers in the community as part of that. We've deployed gasifier cookstoves in these homes. Some of the excess electricity that we do produce goes into producing either biomass pellets to replace firewood in their homes. When they've cooked with biomass pellets in these gasified cookstoves, they are left with a biochar, which we actually sell to cement industry. They get an income.

Mallika: You're trying to be quite circular.

Peter: It's a full circular economy. Making sure as much money as possible from the corporates goes to their suppliers in these rural communities, and then the issues started reducing as we go along.

Mallika: I know we're almost out of time, but I'm going to push my luck and come to you with one more question. I'm just really curious about solar panels. I want to talk to you about the supply chain disruption that we've seen now. I know a lot of the solar panels are imported, and they come from mainly China. Hasn't that pushed up the cost of importing solar panels? Has that gone up as a result of the supply chains been broken? Is it time for Africa to consider manufacturing solar panels? Is that even an option?

Norman: I think the COVID crisis, and suddenly the Ukraine crisis has seen the price start to skyrocket a bit. Solar prices went down in the past 7 years by almost 85 to 90%. We catch up a little bit, but it's not that significant. Is there an opportunity to start to locally manufacture solar? It's been tried. It's a nice fancy idea, but solar, you need critical mass. You need economies of scale to do so.

Mallika: Correct.

Norman: However, there is a huge opportunity to assemble, particularly batteries storage, because they are, by nature, very heavy and they take long to come to the ground. I think there is an opportunity there. As for solar panels, I think China continues to be the player, the manufacturer of the world, and will probably be there for a while because they have got what we call the Bloomberg Tier 1 suppliers. The financiers look at the quality of the deployments and the quality of the panels.

Mallika: You talked about batteries. Great question. The material resource for batteries are in Africa. How do we move forward with the conversation about bringing the manufacturing of lithium batteries to Africa to reduce the total cost of ownership?

Norman: I think the most beautiful part, as I said, if I was a millionaire, the one business I would like to put in right now in Africa is in energy. Why? Because everything else works on top of that energy. Everything that we heard from Minister Sinha, the digital world in Africa, the telecoms, the fiber, everything in Africa needs a stable power system. I'm based in Johannesburg, and we're suffering from two-hour, four-hour load shedding right now in probably one of Africa's biggest economies.

You cannot afford even a 10-minute blackout, let alone a 4-hour blackout. There is a huge opportunity to start to invest in assembling of lithium batteries. We've seen a few intrapreneurial startups, and they're doing exceptionally well. I think to the financing world out there, the biggest way to impact the climate in Africa is to start to allow storage. We've got enough sun. You don't need to worry about that. We also get a lot of land but we need storage.

Mallika: Storage is absolutely key. I could go on and on, but we are out of time. We have many more interesting panels to get to. They will be here at lunch, my guests, and we will have that facilitated networking where we can talk about green energy. Do come and find us and we'll continue the conversation there. Peter, Norman, thank you so much for joining us.

Peter: Thank you very much.

Norman: Thank you.

[applause]

[00:18:50] [END OF AUDIO]