Appropriate Technology: Solar Powering Hospitals, Orphanages & Schools

https://mindmatters.ai/podcast/ep209

Robert J. Marks:

Okay, we ready to start?

Brian Thomas:

Oh, give me just one second.

Robert J. Marks:

Okay. Sounds like medicine.

Brian Thomas:

Yeah, you're giving me a headache.

Robert J. Marks:

Greetings and welcome to Mind Matters News. I'm your genial host Robert J. Marks. We're talking to Brian Thomas and Kayla Garrett from Just Energy about their current work and appropriate technology in Haiti. Brian is an electrical engineer. Kayla is an environmental engineer, and together they work in this incredibly poor country where I was informed people on average make a dollar a day and they have to go out and they have to buy gas sometimes on the black market for 20, $30 a gallon. It's just crazy. Brian, Kayla, welcome. Welcome.

Brian Thomas:

Thank you very much.

Kayla Garrett:

Thank you.

Robert J. Marks:

So one of the things that you're concentrated on as engineers is to increase the energy access to Haitians. So what's the technology that you use to increase the energy access?

Brian Thomas:

Haiti doesn't have any petroleum, any oil, gasoline, diesel. Doesn't have any resources like that of its own or even coal so they have to import all that, and that's part of the problem but one resource that they do have in abundance is solar energy. All you have to do is go for a visit to be convinced that the sun is a little brighter down there.

Robert J. Marks:

Oh, it's pretty close to the equator, isn't it?

Brian Thomas:

Well, it's closer than we are. It's at about 19 degrees latitude.

Robert J. Marks:

Okay. Good.

Brian Thomas:

But trust me, it's hot, and that sun is intense and well, that's great. It's great for generating electricity with solar photovoltaics. There's different kinds of solar energy. There's solar thermal that we use the sun's heat to make something hot and then generate steam and turn a turbine but that's not what we're talking about. We're talking about direct conversion to electricity with your standard solar panels.

Robert J. Marks:

Okay.

Brian Thomas:

So that, during the day we can generate electricity for users and we also store, we make more than we use during the day so we can store it in a battery bank and so the systems we're putting in are off grid. There is no grid connection, so they need some kind of way to store energy for the evening. And traditionally this has been done with lead acid batteries. Lead acid batteries are an old technology. It's the kind of battery similar to an automotive battery and that they require a lot of maintenance. They don't last very long and there are some better technologies out there and what we have started using, and this is a little bit unusual in the international development world, I think, is the use of lithium ferro-phosphate batteries, which are abbreviated LFP and this is the type of lithium battery chemistry that is very durable.

It can be abused, it can be... You can leave the batteries in a mostly discharged state without damaging them, which is not true of lead acid batteries. You can mix old and new batteries together because they have built in electronic battery management systems. That's also not true of older lead acid chemistry batteries. If you mix old ones and new ones, then they'll charge and discharge at different rates and it causes all kinds of problems.

Robert J. Marks:

Oh.

Brian Thomas:

So that's the energy capture and the energy storage and then we use inverters to convert that DC electricity into an AC electricity that can be used by most appliances.

Kayla Garrett:

As Brian said, the conditions in Haiti can be pretty intense with heat, but also with storms, just general ruggedness and we find that these LFP batteries are robust enough to handle the less than test conditions that are in the country.

Robert J. Marks:

Okay.

Brian Thomas:

It's a rugged place and it's a pretty rugged battery chemistry.

Robert J. Marks:

So as an electrical engineer, I want to know what are some of the... Maybe one of the biggest solar systems that you have installed?

Brian Thomas:

Our biggest project was for a hospital, a large public hospital called Justinien University Hospital, specifically for the pediatric wing of that hospital and that's a large... It's a large public hospital in downtown Cap-Haitien and we put a system together there that was sponsored by USAID, and that was actually, it was through a cooperative agreement with another NGO called Konbit Sante.

Robert J. Marks:

NGO stands for non-government organization.

Brian Thomas:

Yes, NGO stands for non-government organization. It's kind of like a...

Kayla Garrett:

Synonymous with non-profit, but in a more international sense.

Brian Thomas:

Yeah.

Robert J. Marks:

I see. Okay.

Brian Thomas:

And with this other NGO, we kind of partnered with them. We were a bit of a subcontractor for them to work with USAID to do this project. I think our budget was around $150,000 and so that's a 34 kilowatt solar array. It's about 150 solar panels that had been put in on an earlier project and we rewire them to be a battery operating system and a inverter system that is capable of producing three phase output power at about 21 kilowatts and the system's working well, and we can even monitor it with the inverters we use have this SCADA capability. SCADA stands for Supervisory Control and Data Acquisition. So in other words, the electronics are connected to the internet and we can monitor them from here. So

we get up and have a cup of coffee and check the solar panels down in Haiti and see if they're producing the energy that we expect them to. Well, that is when the internet works.

Robert J. Marks:

When the internet works. Okay. So I'm a consumer in Haiti. Is the solar power cheaper from the solar or is it cheaper from the grid?

Kayla Garrett:

Well, there's not really a grid in Haiti, so it's kind of a kind of know some question, but yeah, there's virtually no operational grid in Haiti. The state controlled electricity company is called EDH and we've had people refer to the way this group operates as EDH is selling blackouts.

Robert J. Marks:

What? They're selling blackouts?

Kayla Garrett:

Yep, yep, so even under normal conditions right now, there's a fuel shortage, political unrest. This is not considered standard conditions, but even under standard conditions, only about 30% of the entire country has physical connection or access to the electricity grid that is from that state controlled electricity company so only 30% can even access it but of that 30%, no single person has access 24/7. There is not electricity at any given point 24/7.

Robert J. Marks:

That's incredible. You did mention that Haiti is the poorest country in the Western hemisphere, and it sounds like they are really, really poor and in need of just fundamental infrastructure. My goodness.

Kayla Garrett:

Yep.

Robert J. Marks:

So in installing these, I'm sure you probably concentrate on places like orphanages and hospitals and other places of humanitarian help. So how are the hospitals doing where your group has installed the solar power?

Kayla Garrett:

They are operational, which is a massive blessing. We have received some messages from the doctors there about their systems working even in this time of a little bit more crisis. One of the medium sized clinics that's in a town outside of Cap-Haitien, which is the larger urban area, sent us a message not long ago to let us know that the system is really helping during this time and that currently most medical centers are having to close or work really limited hours, but they are still able to function just as they used to and they're treating people with asthma, those in need of oxygen from electric oxygen... Concentrators and converters and he even said that their clinic was able to perform 41 C-sections last month where most people were not able to travel to Cap-Haitien to receive that medical care in this time and that this would not have been possible without the solar system. And he says, quote "That it is a clear example of how a strategic decision can make a big difference and help many."

Robert J. Marks:

That's wonderful. In installing these solar systems, do you... I think you've done it yourself, but do you also employ the local nationals to do that? How difficult is it to install a solar array?

Brian Thomas:

Well, we've developed a really good team down there. It's a small team, maybe five guys, and we have a general manager. We have an electrician, a welder, and a general purpose guy or two and depending on the size, they can do it in a week, maybe two weeks. The large system I mentioned that was sponsored by USAID, I thought, man, this is going to take us a long time, but our electrician is well respected in the community and he reached out to his colleagues and hired five or six other guys that came and showed up and worked under his direction. So it really doesn't take that long. In fact, it's much more difficult to get all the supplies to the location where the installation's going to happen. That part may take months.

Robert J. Marks:

Interesting.

Brian Thomas:

And with the installation itself, it does go faster.

Robert J. Marks:

It's interesting. Most engineers at the undergraduate and the graduate level are kind of interested in going out and making their mark in life. They're interested in going to Silicon Valley, coming up with an invention, going public with their IPOs, et cetera. That's not the typical engineering path that you guys have followed not doing that. How is it that you two have learned how to do relief and development? Where did you learn how to do this and what's your motivation?

Brian Thomas:

Well, I think we said earlier, or maybe we said in the prior podcast, we volunteer our time. We have other... No, I think Kayla used the word, we have other gigs that pay the bills. I play the Congas in a jazz band.

Robert J. Marks:

Do you? No, that was a joke?

Brian Thomas:

Yeah. Yeah.

Robert J. Marks:

Okay. Okay. Thank God. I thought you were like Richard.

Brian Thomas:

It's kind of a dream job of mine. I mean, I have this list of other careers I would've liked to have had astronomer. Conga player.

Kayla Garrett:

Conga player.

Brian Thomas:

Those are my top two.

Robert J. Marks:

But the other thing is that you guys have been presenting papers at conferences too, haven't you?

Brian Thomas:

We have. We just recently, the two of us, presented a paper at the IEEE Global Humanitarian Technology Conference, which was in Santa Clara this year but together we've got about 20 years of experience working in international projects on a quasi part-time basis. I say quasi part-time because it's hard. We don't work 40 hours a week on this, but we do work a lot on it. And...

Kayla Garrett:

The motivation, I think, is very well interwoven into the jobs and careers that we have. There's a lot of alignment in those things.

Robert J. Marks:

I know you also have to take time out to go to Haiti. It sounds like, from what you described previously, that Haiti's a pretty dangerous place to go right now. It's probably not a good idea to travel there now, is that true?

Brian Thomas:

The US State Department has them listed at level four, do not go.

Robert J. Marks:

What are the levels? I'm not aware of that. Is that the highest level or?

Brian Thomas:

Yeah, it's the highest level.

Robert J. Marks:

Oh my gosh. Okay.

Brian Thomas:

So it's up there with Iran. Yeah, Syria.

Robert J. Marks:

Really?

Brian Thomas:

Yeah. And there's been a lot of kidnappings in the last year, even though that's not their biggest problem right now. Kidnapping for ransom, both of international people and also locals, including pastors and children's... People off the street. We know a guy, we know our guy, David, I won't use his last name, but he's been stopped by gangs three times driving down to Port-au-Prince and held up and robbed. One time he said that a couple, there were some other people there that the gang member's shot dead right in front of him.

Robert J. Marks:

Oh my gosh.

Brian Thomas:

So it's a dangerous place, but we try to stay away from Port-au-Prince. In fact, I've only flown through Port-au-Prince, I've never been on the ground there and we stay up in the northern area, Cap-Haitien, which has historically, been much safer. Much safer and you know, we talk to people. That's part of the answer of how we have learned how to do what we've learned to do. We're still not experts, but what we have learned, we've learned by talking to people, we've learned by building relationships with people on the ground, Haitian men and women, and trying to be a good listener, and what are the problems they need ... We don't want to solve problems that we perceive, we want to solve-

Robert J. Marks:

Right.

Brian Thomas:

... the problems that they perceive. And we were told that job creation and energy access are two very big impressing needs.

Robert J. Marks:

We talked about different charitable organizations and how many of them are bloated in terms of salaries of those that lead them. An exception was the Salvation Army, which is a Christian-based organization. They talk about salvation. What do they mean salvation? They mean salvation through Jesus Christ. They are Christian organization. Would you characterize Just Energy as a Christian organization?

Kayla Garrett:

The work that we do is motivated by our faith, yeah, so we hold that people are made in the image of God and therefore have inherent worth and dignity. If these energy systems can help people to pursue education, improve their health, their general jobs and livelihood, increase their standard of living and being able to do that is a way that we can help bring the kingdom of God that Jesus talked about into this world and so largely our work is motivated by our faith and the value that we see in every human and the right to access of electricity, high standards of living is one of those human rights.

Robert J. Marks:

Wow. Well, God bless you both. We've been talking to Brian Thomas and Kayla Garrett from Just Energy about their current work and appropriate technology in Haiti. If you are interested in supporting Justice and Mercy, there's a bunch of ways you can contribute. One is to go to justiceandmercy.energy and spell

out Justice and Mercy without any spaces, justiceandmercy.energy and there you can pay through PayPal. They also have a Venmo account, which is a word I can't pronounce. So how do you pronounce it, Brian?

Brian Thomas:

Yeah, it's Jizeneji.

Robert J. Marks:

... Okay, I'll spell it out now. J-I-Z-E-N-E-J-I.

Brian Thomas:

That's right.

Robert J. Marks:

J-I-Z-E-N-E-J-I and it's not case sensitive, so if you're a Venmo person, that's a good way to contribute. Or if you want to do it the old way and write him a check, their places is Justice and Mercy. Number one, Bear Place, Post Office Box 6003 and that's in Waco, Texas 76798. And I think I got all that right didn't I?

Brian Thomas:

Yeah, that sounded right.

Robert J. Marks:

Okay. Well, great. Well, again, Brian and Kayla, what a wonderful time chatting with you and finding out what you're doing at Haiti and boy, we're very appreciative. This is Mind Matters News. Until next time, be of good cheer.

Announcer:

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