

Bidesh Kar



Director of Product Management
at Sentient Energy

Interview with **Bidesh Kar**



Photo: Sentient Energy

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If you are replacing your aged infrastructure overhead with underground, you are fixing the aging infrastructure problem at the same time you are also building resilience.

Alan Ross: My guest is Bidesh Kar. Bidesh is the Product Manager for Sentient Energy.

We're going to get into product management, because that's right now kind of exciting, there's a lot going on. But first off, tell me a little bit about your background in the power industry. How long you been in it? How did you get in it?

Bidesh Kar: Absolutely. First of all, thank you, Alan, for having me here. I have been in the power industry since 2003, so just over 20 years now.

And back in time, right out of college, I had no idea about the power industry. I was just pushed into it in my first company and never looked back since then. I've worked in companies that provide products and services from substation to metering.

I've worked with companies like Itron, which does smart metering and grid edge stuff. I've worked with companies like S&C Electric, which does switching/protection equipment in the distribution grid. And my last four years been a fantastic journey at Sentient Energy. I'm responsible for the whole underground product portfolio as well as the software platform.

AR I love that we got a lot to talk about with the Underground portfolio. But first of all, when we were here last year and when we were at IEEE doing interviews, and when we did them at RE+, the number one problem last year was supply chain issues. Everybody had them. They're not gone, but we are working on them. But the problem that we have today is the dynamics of change. For instance, Bloomberg have just announced that their prediction for the adoption of EV charging was way off. It's going to be 2.4 to 2.6 times what they said it was. That's a lot of change. So, there's a lot of new demand on utilities. They're going to maintain the old grid, which is aging. With supply chain issues, it takes sometimes two and a half to three years to get transformers. And that's not the only problem. The demands on the utility are greater than they've ever been – maintain the grid, be reliable, be resilient, get ready for DER, make sure you're green, decarbonization.

From your perspective, talk about all of those demand changes and a little bit about how that equates to your job in product management at Sentient.

BK You highlighted two key things that stood out as you were explaining this. Number one, as you said, the supply chain issue is not gone for us. It's going to stay here.

The macroeconomics of it, the geopolitical situation of it, it's beyond any company's control. So, leaving that aside from the utility perspective, I think the aging infrastructure paired with the extreme weather conditions has a very detrimental effect. Now, from our perspective, there's good news too if you look at it.

Companies like Florida Power & Light have proven that undergrounding improves reliability and resilience. So, in the back-to-back storms last year, when the areas with overhead were down with power for several days, the areas with underground barely had any outages. What this means is other companies can look at this example and build a strategy towards undergrounding. And how this helps is if you are replacing your aged infrastructure overhead with underground, you are fixing the aging infrastructure problem at the same time you are also building resilience.

Sentient has a vast portfolio of underground line sensors which covers your whole distribution grid, from the feeder to the last mile on the lateral residential. So, that brings in visibility that otherwise it wouldn't have for your underground networks.

AR Underground makes sense, especially in fire prone areas, because then you don't risk fire ignition when you run the lines underground.

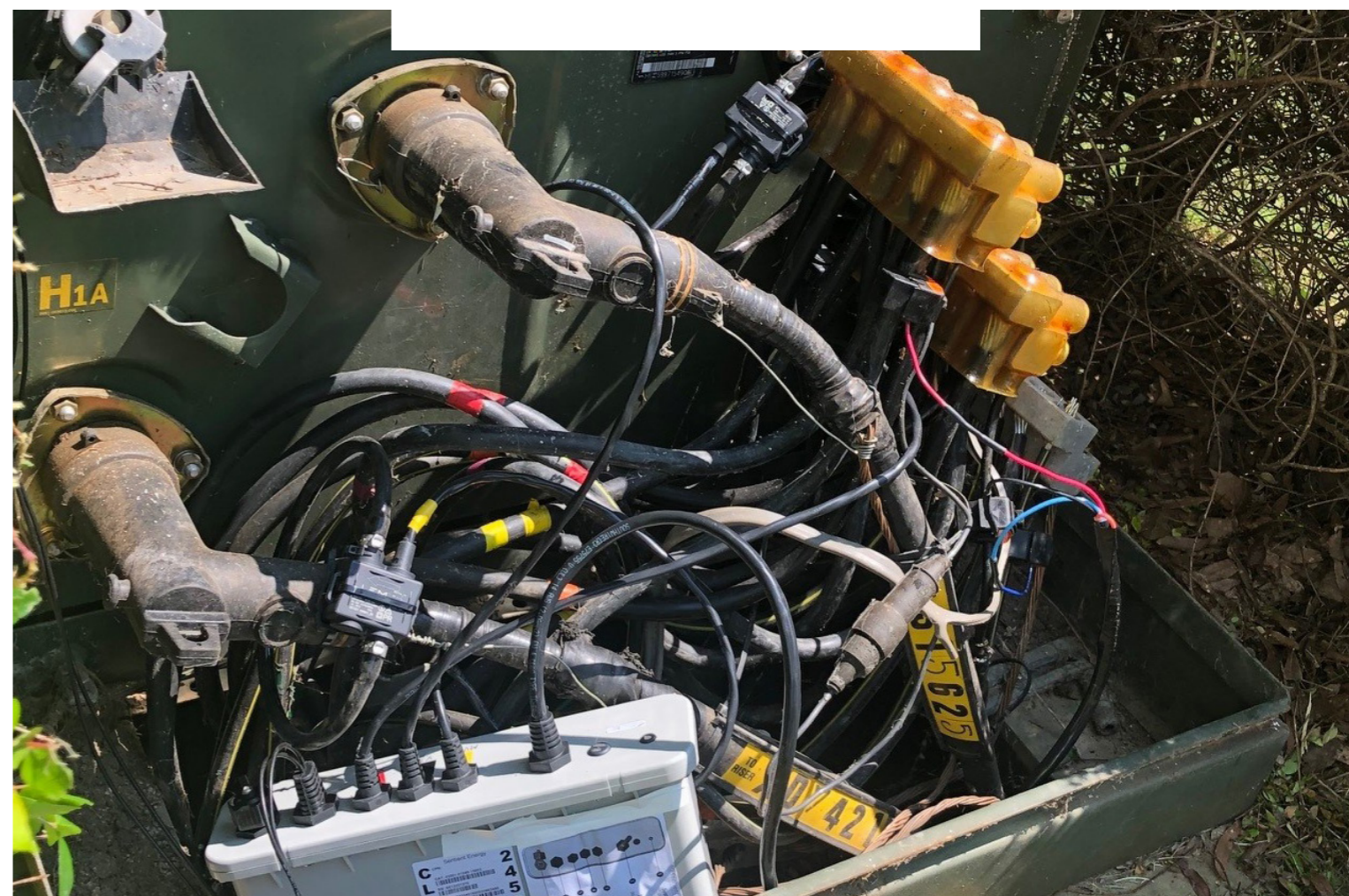
There's a cost to undergrounding. What is the cost differential between overhead and undergrounding? I used to hear that it was about four times. Is that still the case or not?

BK Well, there's a difference. You cannot look at the cost of just undergrounding at once. You need to look at the total lifecycle cost. So, Sentient Energy is a partner member at PDi2 (Power Delivery Intelligence Initiative). It's a nonprofit organization. We have done a lot of research and models where utilities can look at it and say, "What's my total cost of ownership of underground?" It's not just the \$200,000 or a million dollars per mile of underground conversion, but imagine once you have undergrounded and there is a storm or a tornado, it's not getting those lines down three times in ten years. So, you add that up, you add up the safety aspect of it, then it makes sense in most of the cases. Otherwise, PG&E wouldn't have gone for 10,000 miles of commitment.

AR Most utilities are state regulated, right? They have to go to the Public Utilities Commission, and a lot of rate-based things are



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based on capital spending. Is most of the cost of undergrounding covered by capital?

BK Yes, because you're improving your reliability of service. So as a customer myself for PG&E...well, the area I'm in is already undergrounded, but imagine not losing power anymore when there is a high fire threat and there are critical patients and those who need life support. I think it makes sense ratepayers wouldn't mind that increase over time as long as of course it has to be kind of vetted out with different parties.

AR So that is a great connection between what you do and the focus on reliability. At the same time, utilities are dealing with the hockey stick of the demand curve which they have not had to deal with in the last 15 years. There's going to be competing priorities

for that. How do you address that? I mean, you're going to compete with people saying let's just get as much power to as many people as we possibly can. Forget about underground. How do you answer those people to say, no, we are a solution that is going to be a better solution long term than short-term reactionary solutions.

BK I think the change in demand profile has immense impact on how you do your asset management strategy. What it means is your typical duck curve doesn't exist anymore, and here is why: we are pushing for more EV. That means that when you come back home from work, at five, six in the evening, you are plugging in the EV, so your load profile just increased dramatically. Let's say you don't plug in at 6:00 p.m. You have it programmed to run late at night. The power consumption of an EV to fully charge is equivalent to a fully running

home, which means your load didn't drop after midnight. It actually stayed at the same level, because now, even though the lights are off, your EV is charging, so it's still pulling the load. How do you balance that? The typical grid, the traditional grid, was planned for single directional power flow. If I pick a transformer, a 50 kVA transformer typically would have seven customers. Now all of a sudden, all the seven homes plug in EVs at the same time. That wasn't what it was planned for.

While a transformer can operate at beyond its nameplate rating, you do not want to do it day over day, week after week, year after year. So that's where we come in as an end-to-end solution. We have one of our newest products UMI - it monitors for fault in our underground system, but also monitors for your loading of the transformer. One of our customers was

recently flagged as having the transformer overloaded 150 times over eight months. And the peak loading was 212%. Average was 126%. That's something you don't want. Now with this data they can upgrade it to a 75 kVA transformer before it fails. This is what we call data-driven asset management strategy - don't just wait for the transformer to fail.

AR So given the fact that you're in product management, you have to be looking ahead at what's coming. What are the issues that the industry is facing that you're solving?

BK There are a couple of things that come to mind. Number one, utility companies. I feel for them because they are under a resource constraint. They have a ton of projects to work on and they can only focus

Just having gigabytes and petabytes of data means nothing unless it's actionable. So, one of the challenges I think needs to be solved over the years is what are the actionable insights. Don't just show me the data. Tell me in a nutshell, what action do I need to take today, three weeks from now, a month out.

on so many things. A solution to that is as they are dealing with all these different software platforms and data points from all different kinds of devices, they need to look at more at what cloud capabilities they can leverage, so that the in-house team doesn't need to focus on managing, doing the cookie-cutter task of system management, but they can focus on how to optimize their business processes and have other vendors kind of take care of cloud-based solutions and deal with the data. And the second thing, very linked to that, is an immense amount of data. Just having gigabytes and petabytes of data means nothing unless it's actionable. So, one of the challenges I think needs to be solved over the years is what are the actionable insights. Don't just show me the data. Tell me in a nutshell, what action do I need to take today, three weeks from now, a month out – so that something that's likely to get impacted further along the line I can delay, and then I can prioritize my workforce.

AR Since you just talked about that big data - I know a utility that I spoke with recently mentioned that they hired more utility and data scientists that year than they hired electrical engineers. And they said that was a first for them, which is kind of an indication of what you're saying. There's just going to be a huge need for people that help us, because data scientists don't make a decision. They just create data that allows us to make the decision. The demand for electricity is doing this, the amount of data with all of these wired systems and wireless systems is doing that too.

Okay, so we're on an airplane, we're at 35,000ft. Let's assume that we mitigate the supply chain issues, that we begin to really integrate DER into the whole network. We are decarbonizing, we are putting more utility work underground so that we can create a much more resilient grid. What do you think are the storms on the horizon that we ought to be looking at now that are going to be coming in ten years, if we could predict them?

BK Well, that's a hard one. We are thinking that, you know, just bringing in solar PV and EVs is going to decarbonize, but you still need to look at the variations those bring in. You know, the sun is not shining 365 days a year at the same level, so you still need your traditional means of generation in place. How do you balance all of that without impacting your service levels?

The second thing is that a lot of these product solutions work on their own. So, what the utilities would need to think of is how do I minimize or optimize the information that I'm getting from all these systems? How do they work in an integrated fashion? I don't want to jam my communication network with millions of devices out in the field. Can some

of them talk to each other? I think what we're looking forward to is that different vendors like Sentient and other companies would need to partner together and have those devices talk to each other locally and make grid edge decisions – and what that means is open protocols and open communication, standardized communication mechanism and data exchange across devices.

AR Does that not increase the risk for cybersecurity?

BK Of course, it does. But we do have the technology to make it cybersecurity. You can have them all communicate within the utilities. Private LTE is the utilities network. They can manage it as long as all these devices talk within their network, that's absolutely fine.

AR EVs and EV charging - most of that is underground. You don't see overhead lines going to you. So, they've already adopted the charging technology, but they haven't adopted a standardized approach to plugins. I mean, I rented an EV, and I could not charge it at the Tesla charging station because my connector didn't work with the Tesla. So how does Sentient work within the industry to do open architecture, open protocols? Everybody has a part of the solution. Where do you come together to create standardization of those kinds of things?

BK There are areas where things are very well defined. DNP3 protocol is a very common protocol used for communicating across all these devices. That's just at the device level, however, how different systems interact. For example, our analytics platform can ingest data from a completely unknown device. I think that's the kind of standardized interaction or integration that must be in place. We are thinking ahead in terms of building open application programming interfaces, which is called APIs, so that anybody can consume the data. We are thinking along those lines where we publish a message, anybody within the secured network can actually subscribe to it. I think we'll see more of those changes coming in down the road. And to your point about EVs, yes, absolutely. We want it to be like a gas station. You know exactly how it works. So, on the EV side of things, all these manufacturers have to go towards the standard.

AR Excellent. Bidesh, thank you for joining us. It's been a delight and I wish you good success at Sentient.

BK Thank you, Alan. Nice speaking to you.