Steven Watt

Senior Product Marketing Manager
at Sentient Energy

Interview with **Steven Watt**

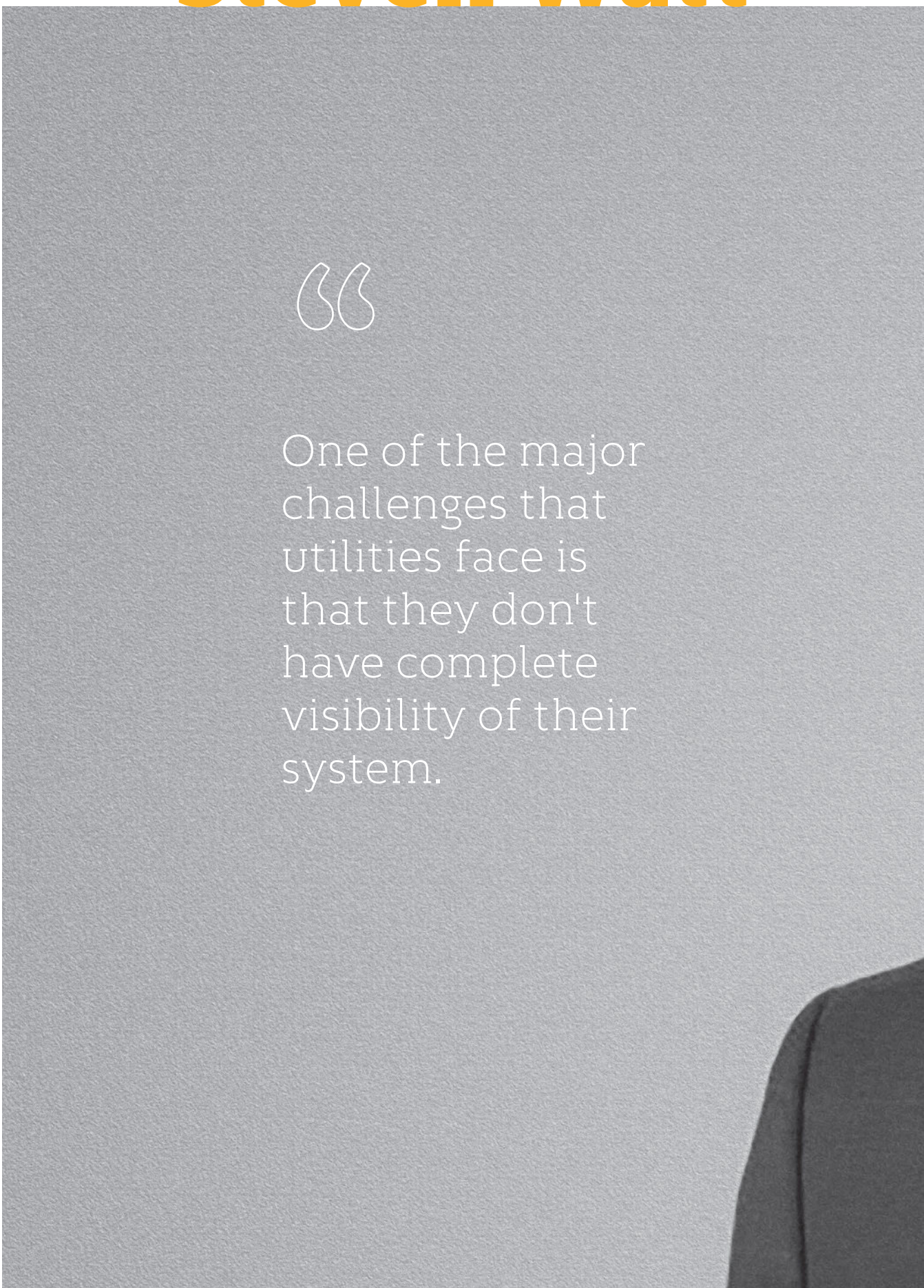

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Photo: Sentient Energy

Steven Watt is the Senior Product Marketing Manager at Sentient Energy, a company that provides innovative line sensing, data analytics, optimization and control technologies for the distribution grid. In this interview Steven talks about problems that the utility industry is currently facing and how his company helps solve them.

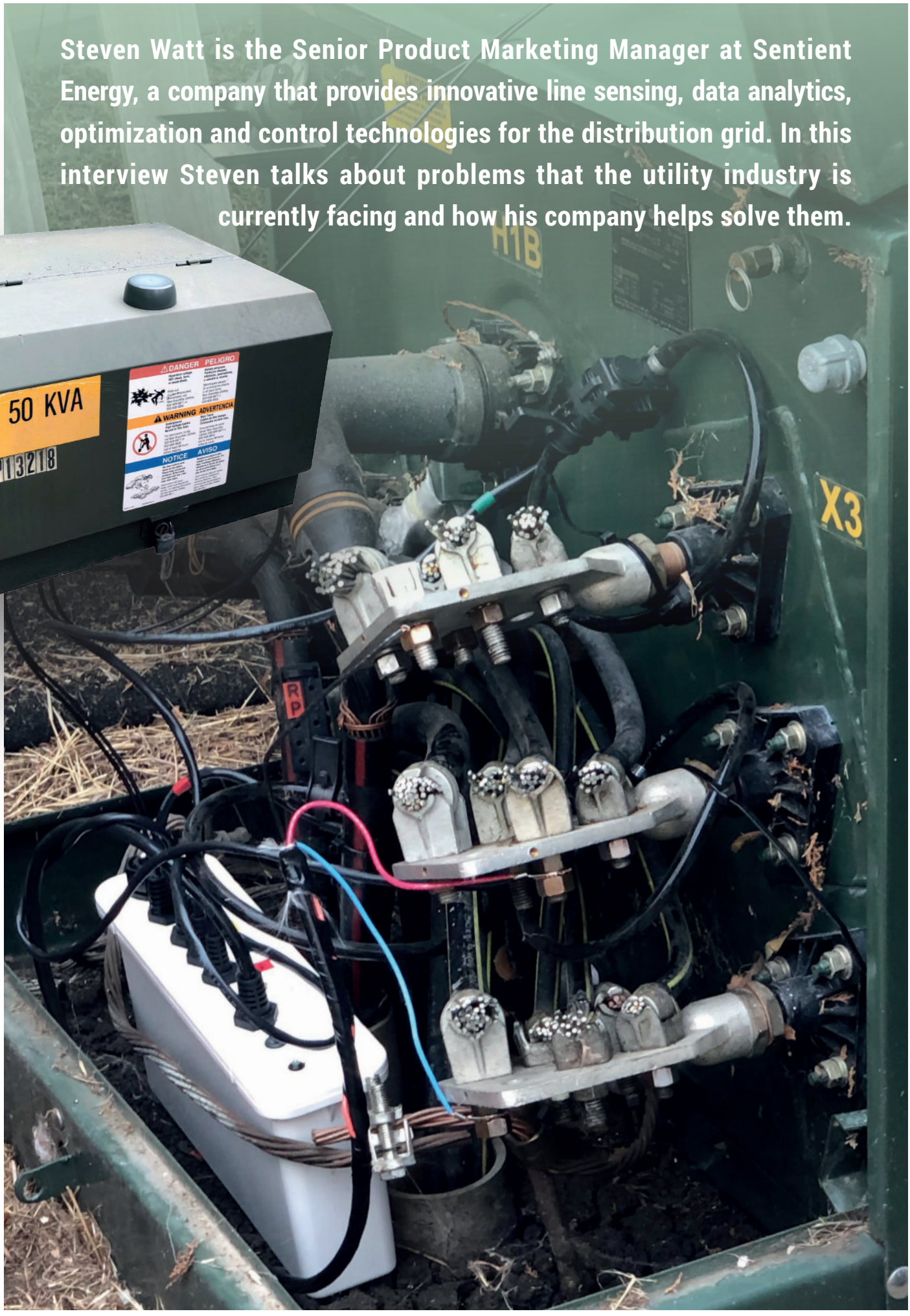

Photo: Sentient Energy

Alan Ross: Steven, welcome to this interview.

One of the things that we at Power Systems Technology are trying to do is to find out the challenges and problems that the energy market is facing, and then to hear from Thought Leaders on how these challenges are being met. You are in the electric utility industry. Could you tell me just a little bit about your background? How long have you been in the industry?

Steven Watt: Thank you, Alan. I worked for over 20 years in the IT industry, and I was working quite a bit on energy efficiency in IT products. Then I jumped to the power utilities market in 2012 where I have been for the last ten years, focusing on networking and communications for utilities.

AR This is interesting. You jumped in just when a lot of the problems really got exacerbated. Because it's no longer just about the power, it's also about the data and it's about the IT. Your company solves problems. Sentient Energy offers intelligent line monitoring solutions both underground and overhead, but what do you think utilities are really facing in terms of problems with their lines today?

SW I think one of the basic things is that they don't have complete visibility of their system. They can often see down to the distribution substation if they have communications into that area, but then they don't have much visibility beyond it. Utilities are also facing challenges on feeders and laterals with reliability problems, which are hard to solve if you can't see what's going on in those parts of the system.

AR When you say "see", you are not talking about it in a visual sense of the word. And while the visual is also important, you are actually talking about seeing the condition, seeing what is going on, seeing the faults, correct?

SW That's right. Mainly what I am talking about is monitoring current so you can detect and locate faults, but also monitor load so you can see when load is at levels that are too high, etc. But then beyond that, what utilities told us they want to do is also monitor some assets. And I think this has become a lot more critical because of the long supply chain lead times on assets like transformers. I would say they want more visibility. They want to locate faults more precisely so they can send crews directly to the faulted segment with the right equipment, the right trucks, etc. They want to monitor their critical assets proactively instead of using a run-to-failure model.
And this is especially important when you think about how a lot of people are working from home and there are more requirements now to have high reliability on laterals and underground residential distribution because people are counting on the power more than they used to.

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AR One of the big new problems is also the fact that we are moving from a step-down system, where you generate power and then step it down, to what I call a "step everywhere" system, where EV charging is taking power, giving power, there are renewable sources, etc. So, all of the assets you are talking about are being stressed as they've never been before. I like the idea about improving visibility or monitoring from the distribution down into the customer's markets because visibility of that is still lacking. The utilities thought of putting all these wonderful monitors on houses to let them know how much to charge people, but they still don't have the visibility of the line, do they?

SW They have better visibility now at the meter and usually, like we said, at the substation. The space in between - we call that the grid edge, is the space that we have been focusing on lately. A lot of people include the meter in the grid edge, but we consider it to range from the substation down to the meter. And that's where there is generally poor visibility and big opportunities for improvement.

AR Speaking of grid edge, I happen to be on the steering committee of the IEEE Grid Edge Conference and Exposition in San Diego in April 2023. IEEE has a PES T&D conference every two years and in between those we are going to organize IEEE Grid Edge conference. I would love to have you there.

You just said you are in the IT world, so you understand data. I feel like there is more data going somewhere and fewer people looking at it and making decisions with it and about it. So, could you talk a little bit about that? When you talk about monitoring, that to me means you are looking at data. How do you at Sentient Energy handle that?

SW First of all, when we talk to our customers, we always try to start with pinpointing exactly what problem needs to be solved. Are we trying to reduce outage duration?

Okay, that's one set of data. Are we trying to improve phase balancing? That's another. And asset monitoring is yet another. But I believe the key to data is having the ability for the customer to select the data they want, and how frequently they want to receive it. This is basic. Then also to have support for multiple deployment models of the software. A lot of utilities consider this OT data, and they want it to be on premise. But as you start to look at opportunities like predicting outages or trying to apply analytics to data to predict and be proactive, then deployment models such as the Cloud offer a lot of advantages. So, what we are trying to do is offer multiple deployment models, have an on-premise model, have a Cloud, and then have a hybrid, too, where you can mix the pieces, and that in turn helps clients in the long term to manage their data more efficiently.

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AR Data is one thing. Data turned into information is another. Information turned into wisdom is what customers really need. They need the people in the marketplace to bring ideas and solutions to them that provide not data in its raw form but what that data tells us.

Obviously, you have a lot of data that is not just about one customer, it's about all customers. And you can put that data together in a better form than one customer. Is that correct?

SW I think that's the advantage when we get into analytics. We have an analytics team that is looking at data from multiple customers, and we only really focus on one industry - power utilities. A lot of the analytics companies do analytics on ten different markets: manufacturing, healthcare, and so on. We, on the other hand, deep dive into power utilities. And we feel like that gives us a real advantage because when you are looking at waveforms for the power system and you get to know the power system, you can disregard a lot of "background noise" like a capacitor firing here, or maybe some switching going on there if you have that deeper knowledge. I think part of it is also that in order to really make good use of the data, you need to have some depth of knowledge on how the power system works.

AR Steven, you have a new solution. And we try not to be product-specific here, but I love what Sentient Energy is doing. The idea that there is a part of the grid between the meter and the distribution center that is forgotten is incredible. Tell me more about what kind of solutions you have come up with more recently.

SW We started with intelligent line sensors for overhead, and we did the feeders first - that's our MM3 product. Then we did the laterals and moved to underground and did the feeders. The product we just released is generally for the single-phase laterals or so-called underground residential distribution. The overhead sensors actually hang on the line and they are not installed inside anything. The underground feeder product is typically installed in switch cabinets. But it could also be installed in underground vaults. Now, when we built this one for the underground residential distribution, the logical place to put this product is in the transformer cabinet. What's exciting about this product - called the UM1, is that we see this as the intersection of line sensing and transformer monitoring. Because when we built this line sensor, we didn't just do our normal line sensing features on the primary side. We also decided to monitor the secondary side of the transformer and provide some transformer monitoring capabilities. And so far, we have done pilots with this product with about half a dozen customers that have tried it, the thing that the customers are most excited about is the transformer monitoring.

What gives us a real advantage is that we only focus on one industry - power utilities. Having the depth of knowledge on how the power system works helps us make good use of the data.

AR I know what you mean. I'm a transformer guy, so when you said what you said, I thought, "Forget the rest of this, tell me about the transformer side of this thing."

SW I understand. We are coming from the line sensor side, and we are saying, "These guys are crazy about the data on the transformers!" And we have already found transformers that need to be replaced right away.

AR Steven, you just touched on something very important and that is run-to-failure. Distribution transformers, for the most part, run to failure. And this is a global phenomenon, not just in the U.S. and Canada. I don't think people realize how much more money it costs to replace a transformer that's failed than to replace it before it fails. Tell us about what you found as you went on.

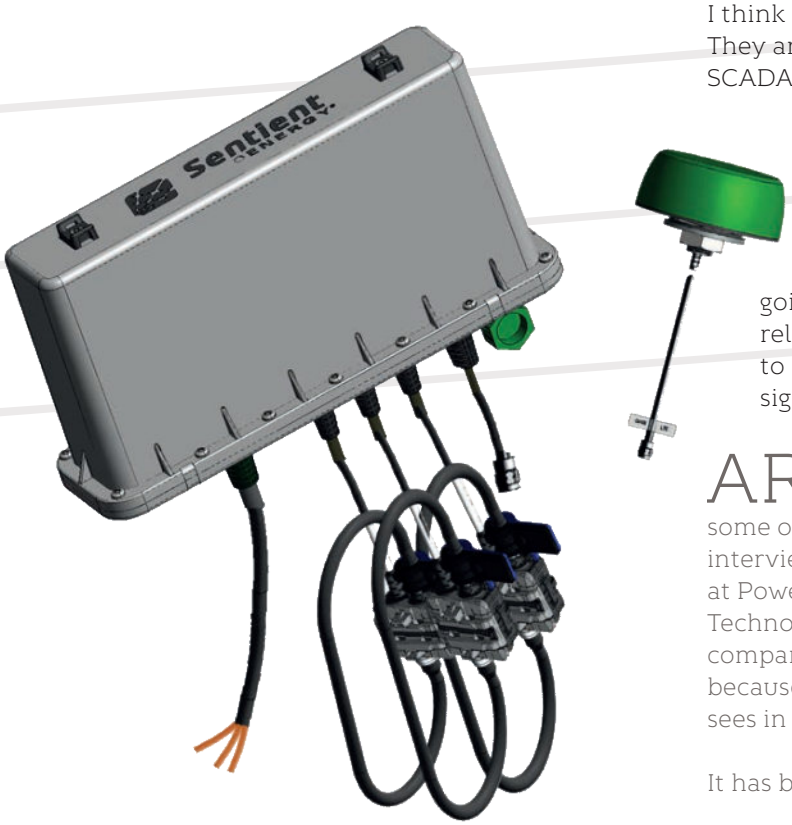
Photo: Sentient Energy

SW We discovered a couple of things. One is that utilities have been used to this idea of a duck curve for load data. And what has happened is that solar and EV have really done a number on the duck curve. It's no longer the way it used to be.

Our new product is the intersection of line sensing and transformer monitoring. Apart from line sensing features on the primary side, the sensor also provides transformer monitoring capabilities, which our customers find particularly exciting.

AR Yes, it's now called the three-humped-camel curve.

SW Yes. And I think it is interesting to see it and see what's really happening. The other thing is that on this product where we monitor the transformer, we can also monitor reactive power and kVARs. So, in some cases, what we have seen is that the solar is actually too high in voltage, and it's basically creating negative kVARs. And some of the EV chargers, especially the ones that aren't as expensive and are not using batteries, tend to create voltage sag. They tend to be inductive. What you have is this capacitive load coming from the solar system and some increased inductive load.



These intersect at the transformer, creating stress on the transformer because those two load waveforms don't match up.

The grid edge is the space in the network ranging from the substation down to the meter. This is where there is generally poor visibility and big opportunities for improvement.

AR Before we close this interview, give me just one thought. What do you see as the future? What are the future problems and future solutions within the utility industry in North America?

SW From our perspective, and we are focused on the segment between the substation and the meter, I think the future opportunity is to increase the visibility of this segment and be able to react more effectively to problems that occur there and reduce outage durations. That's the work that a lot of utilities are doing today. But what our solution does is it helps you immediately. It allows you to get a return on investment today because you are reducing your CMI. It also creates a platform where you can start building toward the predictive capability, because it doesn't happen immediately. You have to capture a lot of data, and it can take months or years to really build enough data where you know what normal is and then you can start to look for anomalies. I think the other big thing is using anomalies. They are not going to be shown or visible in SCADA because they are not creating interruptions. But using anomalies to predict events like equipment failure and vegetation issues, I think those are things that are going to happen. We are just in the early stages of it, but I believe they are going to happen and they will both improve reliability. Because having the ability to predict and eliminate an outage is a significant reliability improvement.

AR Steven, thank you for joining me on this interview and I would like to get some of your other geek-type experts for an interview because one of the things that we do at Power System Technology and Transformer Technology is getting people like you and companies like yours to share your knowledge because you see more than one utility engineer sees in his career.

It has been great talking to you.

SW Thank you for inviting me. It's been great!