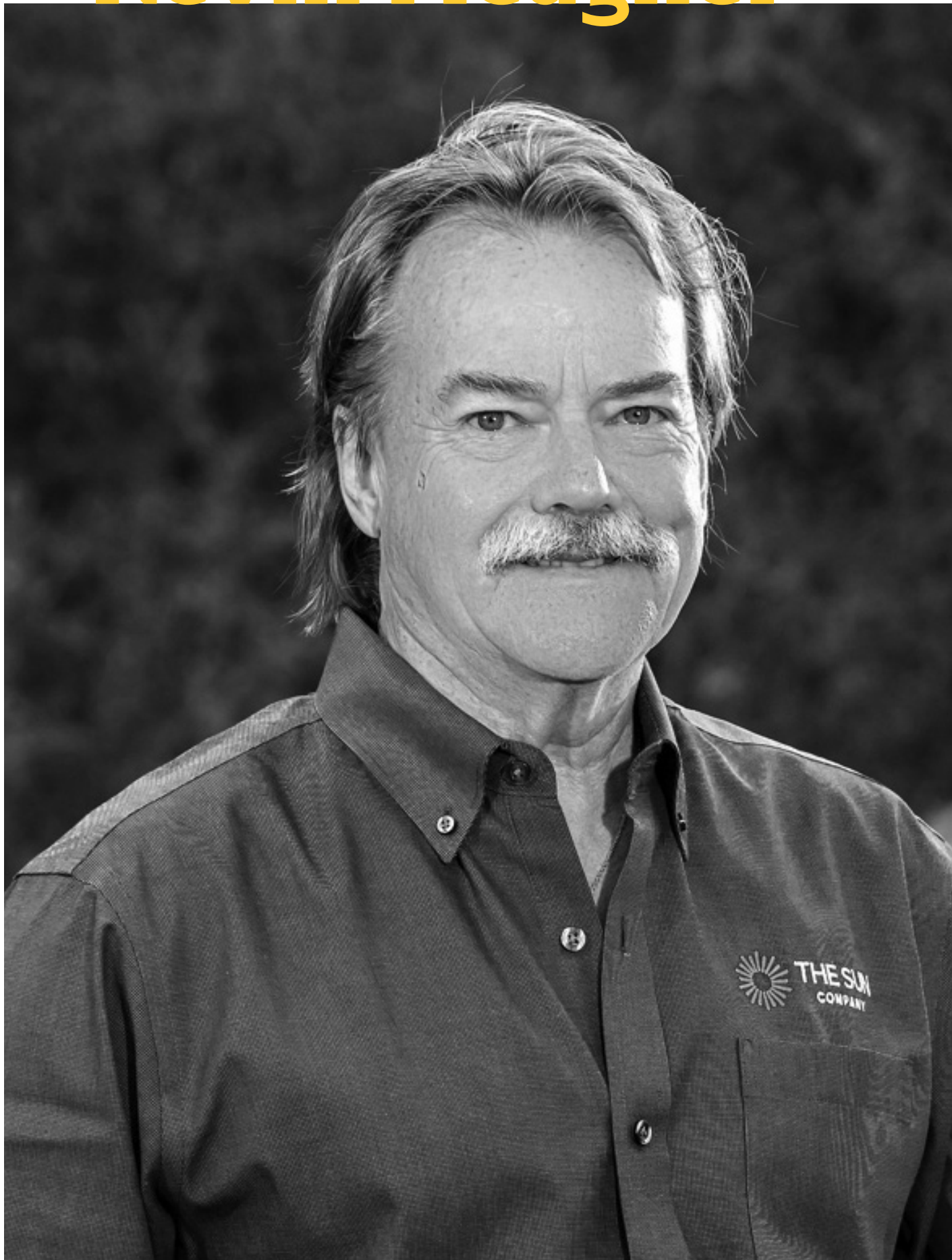


Kevin Meagher

Chief Science Officer
for The Sun Company

Interview with **Kevin Meagher**





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Alan Ross: Hi. I'm Alan Ross, Managing Editor of APC Media. My guest is Kevin Meagher, he is the Chief Science Officer for The Sun Company. Kevin, thank you for joining us. Could you tell us how you got started in all of this and how you became the CSO of The Sun Company?

Kevin Meagher: I actually started in mission-critical applications, analytics really, in the semiconductor days. And there are industries that are very dependent on consistent, reliable power and that slowly migrated from semiconductor manufacturing to power. I've spent about 25 years at the beginning of the microgrid space working with a lot of battery technologies and battery startups for different organizations and then had an opportunity after I sold my previous company, to meet up with and join The Sun Company. And The Sun Company proclaimed a vision that is all about the democratization and rapid advancement of renewable energy everywhere.

And that company in particular has focused on what I believe is one of the really key technologies towards renewable energy, which is energy storage. We are currently developing our own flow battery, which I know you have some previous experience with, but it's a particular technology that's exceptionally well-suited to stationary applications like energy storage. And the combination of energy storage and the rapid expansion of renewable energy is just exciting. It's never been more exciting than right now to be in this industry, for sure.

AR Is it utility-scale?

KM It is utility-scale, but we're not focused on utilities. So, in fact, one of the things that we're doing is what we refer to as Independent Renewable Energy Power Plants. They're areas that are designated with the greatest possible amount

of energy storage. But they do not have to be connected to the utility either because there is no adequate service in the location like the desert in California or in other places. So it is only connected to the utility when it makes sense. And I believe it makes tremendous sense. I'm one of those people who believe that microgrids will enhance the reliability and resilience of the macro grid instead of the other way around. Add to that the flow battery we are developing in collaboration with a couple of the Department of Energy national labs.

AR When the hurricane hit five years ago in Puerto Rico, I was the president of an organization called the Electric Power Reliability Alliance. We were asked by the DOE to look at the proposal to spend \$5 billion to rebuild it. Our answer was that they should do storage and microgrids instead of big generation plants and sending power over the mountains.

If we had done Puerto Rico that way, the last hurricane would not have had the impact that it did again. We are coming to realize that the old system has done well for us but that it's not working anymore.

KM And it's funny because in every other advanced technology today, we always go to distributed architectures as the right solution. But it's been more difficult to do with power partly because power is a different animal. Firstly, nobody's going to get killed from having a bad cell phone but you can definitely kill people with power and start fires. So it's a lot more complicated problem. But there's no question in my mind that it's the right approach.

AR Let's talk about the idea that we're at a point, the inflection point where the whole decarbonization and renewable energy movement is happening rapidly. Battery storage has got to be a big part of that solution or else it just doesn't work at scale. So talk about the industry. From what you have seen, where we are today, and what are the current challenges that we're going to face?

KM I was fortunate enough to have been heavily involved in the DOE Sunshine Initiative and I believe that is one of the most successful Department of Energy programs that ever happened by far. And they're now doing something similar with the Grand Energy Challenge, trying to structure it the same way in a similar approach. But the changes in the industry are this bizarre convergence of unfortunate events both from climate change and the resiliency factor that that's bringing into play, as well as the realization that

distributed energy makes a lot more sense for resiliency, not just for reliability on the macro grid. And there are other technologies like EVs that are really driving even more reliance on reliable energy than we've ever seen before. And then you throw in the Ukraine war and just the geopolitical problems that everybody's concerned about like supply chains, available technologies. And it doesn't just concern power people anymore but everyone.

AR One of the challenges that we most often hear about is the fact that we have built a sub-optimized grid. There is no real interoperability. How does what you do affect interoperability? How is The Sun Company becoming part of that interoperability equation?

KM Like many companies of our size, we are heavily dependent on enterprise software technology, which absolutely embraces interoperability as a primary consideration and one of the most important things to think about is the impact of cybersecurity on these mission-critical systems. So we've got the hardware components and all of the management of that from a power perspective and then the overlay of that, as we call it, our digital twin, which is this idea of designing a physical system electronically and then being able to simulate and modify that as well as operate it. I'm an IEEE guy too, so I completely understand a lot of the reliability concerns. And I think they come partly from the question of interoperability on the power side. Most people still associate interoperability with communications protocols. And the predominant communications protocol in the power industry still is the modulus. It's 20 years old, but it's the cheapest thing for a manufacturer to put on a board. So that's what they do.

The key to making this work is recognizing the fact that there is a significant amount of installed equipment that you have to work with. You don't have the luxury of replacing everything. So you have to be open architecture, if not necessarily open source, but you have to be open architecture and you have to embrace the standards like IEEE 2030 on our microgrid site. That makes all of this a requirement in order to meet that standard.

AR You're doing something at The Sun Company to change the world for the better but nobody can do it all alone. So talk a little bit about how The Sun Company specifically is addressing changing your world.

KM I have to give a shout-out to our CEO, Joley Michaelson. She's an unusual

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visionary who has a passion for building an organization that has some of the best standards, objectives, and values that are well articulated and she makes sure we as a company live them. And part of that is also recognizing that to be successful, a company has to embrace all of the people that it impacts, not just the people who can afford something. So we look at what the requirements to deliver renewable generation are. And if there is an impediment to that or a dependency on something else, how do we solve that dependency? We are a unique collection of talented people that have lived

through a lot of trials and tribulations over the past 15 years and have decided that we want is to make a difference. And we're going to make a difference by delivering what we believe will be the best energy storage technology for stationary applications, as well as being able to address this democratization of power so that it's ubiquitous in its application rather than centralized.

AR I'd like to talk a little about the whole idea of flow batteries. I was sold on them ten years ago and I didn't even know



what they were, but I thought they sounded like something that could be a game changer because of the scale and the fact that they don't depend on lithium. Tell me a little bit about what The Sun Company does in that space.

KM The technology we use was developed at the PNNL lab and it's the highest energy density that we can get in a flow battery. We think that in order to achieve the kinds of penetration levels, we have to be able to get above 250 watts per liter. So starting to get to the low end of lithium, but

not having the environmental concerns. And as you said, flow batteries are unique. With the exception of maybe annual servicing on pumps and switches, they really don't wear out. The electrolyte doesn't wear out. They don't require any special environmental conditions. And new advances have started happening a lot more in Europe now as well. A couple of months ago, there was a flow battery symposium in Brussels. The Europeans are now very focused on flow batteries. There have been huge advances in the past couple of years. Vanadium batteries were one of the early ones.



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Now the focus is on getting more energy density to get a smaller size. Because you really want to get a flow battery that will fit in a residential environment. Ultimately, that's where you want to be. I'm talking about homes, where you need high energy density, very good efficiency, and a footprint that ensures that you have extensive runtime on a 200 amp circuit.

AR That is a game changer. Are these going to be above-ground underground?

KM It's likely that the tanks will probably be below ground just because it's

more stable, like the geothermal, but not necessarily so. And the power electronics will be in your garage.

AR That's excellent. The Sun Company hasn't been around for a long time. But obviously there's a pedigree with your CEO, yourself and many others. A lot of other people talk to me about the value system that makes it work.

KM I'm old enough to have been around a lot of organizations and companies that have professed a level of concern, whether



they now refer to it as ESG or not, that is more for a report or more for talking points in an interview as opposed to the way they live it. And the difference with The Sun Company is that Joley leads by example. It's exactly what she says. We are always discussing not only doing things for The Sun Company but making sure we do things for our local communities as well. We ask our team members what they're doing, how they're volunteering, what they're involved in, and how can we help in that process. As well as just some very simple things, whether it's authenticity, which is maybe the most important one, the quality

of life and your life balance to the way you interact with other people around you. And it's the grit to be able to get through all that and a small set of values that really represent an extraordinary approach to problem-solving. It's getting everybody on board and everybody to believe it.

AR That is absolutely excellent. Thank you so much for being here today, Kevin.

KM Thank you so much for the opportunity, Alan, I appreciate it.