Angela: How do you turn a camcorder battery into something that revolutionizes the future of transport?

Kurt: When I told people I was in the battery industry, it was, "Wait a minute, you're doing like a AA battery? What are you doing? What could possibly be interesting in that?"

Angela: In our Focus on Batteries podcast, we spoke to a lot of experts who had been there as batteries changed and evolved. We really enjoyed our interview with Kurt Kelty…

Kurt: As an EV startup, nobody really took us seriously in the beginning.

Angela: …who was at Tesla during that critical time.

Ident: Are we recording? This is BP Technology Outlook Focus on Batteries Podcast.

Angela: I'm Angela Lamont, technology journalist. It's just great to hear the stories that you never hear. To hear that story of why, and how, and when things happened is absolutely amazing and Kurt was there.

Kurt: I ended up spending 15 years at Panasonic, and 13 of those were working with batteries, I eventually joined Tesla in 2006.

Angela: And what happened at Tesla while you were there? That was a pretty fundamental, groundbreaking time, wasn't it, for that company? In terms of batteries.

Kurt: This was very early days. I was employee number 50 or 60 there and I was the first battery person at Tesla. We figured out how to, first of all, source the best batteries and build the safest and highest performance battery pack in the industry. That enabled the Roadster. A really exciting time in the startup, that we were just growing like gangbusters. We really changed the whole automobile industry while I was there.

Angela: So you were the first battery person at Tesla? I mean, no pressure!

Kurt: Yeah. They had a bunch of engineers that were brilliant at Tesla, and they were trying to figure out how to use the battery. What Tesla needed at the time was somebody that could help them, first of all, source the best batteries; and had a good knowledge of who made good batteries, and what made one battery better than another. Eventually, we settled on Panasonic, because they made the best battery in the industry. We built up a tremendous relationship over the next ten years.

Angela: But back in those days, if you don't mind my saying so, the batteries in most electric vehicles were pretty lousy. They didn't have a great range. The industry had a problem. What was it that made Tesla different? Was it the amount they spent on R&D? Did they work hand-in-hand with suppliers to improve the battery technology? Because it came on in leaps and bounds, didn't it, at that point?

Kurt: You described it quite accurately. The batteries that were available in the industry at that time were terrible. They were atrocious. Well, the reason is that they were using technology that wasn't appropriate for EV. They were not using lithium ion at the time. The reason for that was the safety concerns.

Kurt: The concern that we had as Panasonic is that if a startup EV company built up a vehicle with our batteries, and ended up burning on the side of the freeway, the headline the next day in the paper would read, "Panasonic battery burns on side of the road." None of us wanted to risk our brand on some startup EV company.

Kurt: When I was at Panasonic, I got frequent inquiries from startup companies that wanted to build an EV. We would always just say, "No way. We have no interest in that."

Kurt: When Tesla first approached, I was preparing a similar response, but what was interesting is these guys actually seemed like they knew what they were talking about, so I learned of their approach, and it really was novel.

Kurt: The reason that Tesla was able to really leapfrog everybody is they wanted to use lithium ion batteries. They could use lithium ion batteries because of the philosophy that they didn't care about the safety of an individual cell. They cared about the safety of the battery pack.

Angela: So they seemed to be thinking about it from a completely different way, and maybe encouraging the battery manufacturer to also think about it in a different way. Was this essentially starting from scratch?

Kurt: No so what we did in the beginning...so Tesla had zero influence on the battery manufacturers of the world. As an EV startup, nobody really took us seriously in the beginning, so we had to use existing cells. We used an existing form factor and existing chemistry, an existing off-the-shelf cell, and we just used it in a different application. Now that changed over time. In the beginning, we had to use an off-the-shelf cell. Then we were able to work with SANYO, and then after that Panasonic, to get them to modify the cell slightly for us. Then eventually, we got into customized cell development.

Angela: Now, there's a statement here from Tesla. I'm not quite sure of the date of that, but it says, "To ramp production to half a million cars per year, Tesla alone would require today's entire worldwide supply of lithium ion batteries." That statement there raises the eyebrows, doesn't it?

Kurt: That's a statement left over from 2013 and that's what we figured we would need to manufacture 500 thousand Model 3 vehicles. That's when we decided to build the Gigafactory, because we realized that we could not count on buying the rest of the world's lithium ion supplies, so we decided to build our own factory.

Kurt: Right now, the battery cells for the Model 3, 100% of them come out of the Gigafactory.

Angela: So just looking at your time at Tesla, although you've been in batteries much, much longer than that. Tesla's an interesting one, just because you said that you were the first battery guy, which is pretty amazing. The challenges you faced when you first joined Tesla must have been incredibly different to the ones when you left 10 years later and you had all these production models and future planned models. What do you think are the challenges now, not just for Tesla, but for the electric vehicle market?

Kurt: Yeah, your right in saying the challenges are totally different. When I joined in 2006, as I mentioned earlier, we couldn't get the time of day with battery cell manufacturers because we were an EV. Nobody wanted to sell to an EV customer, so it was very difficult to get attention from any of the suppliers. That was my role, was to drum up that interest and to get some of those companies to sell to us. And now you look at, fast forward to where Tesla is now, Tesla's the largest battery consumer in the world. Every door of any battery manufacturer is totally open.

Kurt: In terms of challenges going forward for the industry, I think one big one is I'm concerned about supply, if there's going to be enough battery cell supplies going forward. There are so many companies, OEMs out there, announcing their EV plans, that are significant, I mean really high volume. Where are those battery cells going to come from? I see that as a challenge. There's not nearly enough battery cells to meet the demand of the OEMs.

Angela: I just wanted to ask you, you could have done many things, Kurt, and you decided to be in batteries. What is it? What fascinates you about batteries? Why are you in that industry?

Kurt: You know, it's interesting. When I got into the battery industry, batteries were totally uncool. When I told people I was in the battery industry it was, "Wait a minute, you're doing like a AA battery? What are you doing? What could possibly be interesting in that?"

Kurt: The driver on my side is really the environmental side, and ultimately how can we get ourselves off of fossil fuels. That's been a personal mission that I've been on for so many years, at this point. For me, it's been the best way to impact that. I mean, if you look at EVs, the enabler for EVs is batteries. There's no question about it. Without a good battery, it's going to be a crappy car, with a crappy run time, and they even looked ugly. They didn't have to look ugly, but for some reason all of the developers designed them that way. But anyway, for me it's batteries are just a key element to get us off of fossil fuels. That is a driver. Personally, I'm a vegetarian for environmental reasons, and doing things right for the environment guide a lot of my decisions at a personal level, as well as my career. That's why I've gotten into this, and sunk so much of my time and effort into this.

I'm a big believer that batteries are really going to enable alternative energy, whether it be solar or wind. Without batteries, we're not going to be able to really increase the percentage of our grid that come from the alternative energy sources. They're just too unpredictable right now, and they come at the wrong time. If you combine the solar or

you combine the wind with a battery pack, a very large battery pack, then it really opens up many other opportunities to use alternative energy. That's super exciting as well.

Ident: This was a BP Technology Outlet Production; Focus on Batteries podcast.