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ENERGY

BEYOND THE ELECTRON PODCAST

The Energy Cloud

Moderator: The energy system isn't what it used to be. The days when big power plants generated electricity and sent it long distance to customers are quickly disappearing. Taking its place is a much more dynamic, sustainable and customer-centric model. Navigant Consulting calls it the energy cloud. My name is Chris Warren, your host for Beyond the Electron, the energy cloud podcast series. Over the next six episodes we're going to be taking a closer look at this rapid transformation of the global energy system. In today's episode we'll dig deeper into what's driving this energy cloud transformation and its implications for utilities, consumers and society as a whole. Our guests today are Mackinnon Lawrence, the director of Navigant's global energy practice, who also leads Navigant research, the market research arm of the energy practice covering the emerging technology energy ecosystem, and Mary Powell, the president and CEO of Green Mountain Power. Green Mountain Power was recently named the most innovative company in the energy sector by Fast Company Magazine. It was just the latest recognition of the company's success creating a model for the utility of the future. Mary and Mackinnon, thanks for joining me today. I'm excited to get this conversation started. Mackinnon, I'm going to start with you. Can you describe exactly what the energy cloud is?

Mackinnon Lawrence: Sure. Thanks for the question, Chris. So I think first I'd just like to say that the energy cloud is a term that Navigant's coined really to describe what we see as kind of the end result of the global energy transformation. So there are a couple pieces I would point to to kind of define it. One is this is a network of networks. We're moving away from a hub and spoke model that we've seen for over a hundred fifty years or so, moving towards this kind of network infrastructure with network assets, network customers, value exchanges. So not a linear value chain but more of that network type approach. And the ne the second piece is we see multi-directional value flows, and this goes beyond electricity. We see financial transactions, data transactions taking place at the edge of the grid at increasing frequency. So this is from an energy cloud standpoint it's not just an electricity story, per se, but also bringing in other value exchanges. And the last point I'd make is I think we have to, in terms of the energy cloud, look at it as a complement to the existing hub and spoke model, so it doesn't necessarily replace it, but we certainly see the energy cloud making up a greater percentage of the exchange of electricity and value and data as I pointed to earlier in the future.

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About Navigant

Navigant Consulting, Inc. (NYSE: NCI) is a specialized, global professional services firm that helps clients take control of their future. Navigant's professionals apply deep industry knowledge, substantive technical expertise, and an enterprising approach to help clients build, manage, and/or protect their business interests. With a focus on markets and clients facing transformational change and significant regulatory or legal pressures, the firm primarily serves clients in the healthcare, energy, and financial services industries. Across a range of advisory, consulting, outsourcing, and technology/analytics services, Navigant's practitioners bring sharp insight that pinpoints opportunities and delivers powerful results. More information about Navigant can be found at navigant.com.

Moderator: Right, great. Well so Mary, I want you to talk a little bit, there have been plenty of white papers and articles written about the energy transformation, tell me what it has looked like on the ground for you and what some of the drivers have been for this very significant transformation.

Mary Powell: Yeah, and it is. It's an incredible transformation that we're excited to be a part of. I mean, sort of in a nutshell what we see it is moving away from grandpa's grid and one-way delivery of energy that we've been using for a long time, over a hundred years and that is incredibly economically inefficient and not very resilient. We really see that what we're in the midst of is a consumer-led revolution to a community home and business-based energy system and energy model. So it really is about sort of an inside out approach to energy and creating one that is much more local, much more independent. But, as was pointed out, still relies on the grid on some level. So we really see this as moving rapidly over the next couple of decades to distributed resources of all kinds, and so back to the point of the cloud, call it whatever you will, the reality is we're moving like we have in other industry spaces to an environment that is going to be much more active, it's going to be much more interactive between suppliers. Suppliers are going to be popping up all over the place. And it's all about how we make that transition in a way that works really from and environmental perspective and a socioeconomic perspective.

Moderator: And Mary, I'd like you to expand a little bit on that as well. I mean, you mentioned the word rapid and I think probably you of all utilities are in this in the most rapid sense. You really have been immersed in this transformation. How disruptive has it been for how you run the utility? Has it been completely, has it turned you upside down?

Mary: Hopefully. I mean yes, so as an example we really, internally we don't think of ourselves as a utility anymore. I mean, we think of ourselves as actually an energy transformation company. I mean, it's why, we think of ourselves as a company that's providing as a service. We think of ourselves as a company that is about helping homes transform to a lower carbon, lower cost, incredibly resilient future. So one of the reasons we offered an off-grid package, I think we're the only the utility of, so again we're an energy transformation company not utility that would offer an off-grid package, and a huge part of it was so that we start to change our orientation and we change our thinking about energy and thinking about it as a service. And it's again the same sort of reason why we were the first in the nation to partner on the Tesla powerwall and we have amazing uptake of that energy solution as well as working very closely with solar and storage, the combination of those things with smart electrification, weatherization, energy efficiency. It's really about how do we bundle as many of these things and be a really meaningful part of accelerating this consumer-led revolution.

Moderator: Great. Well, Mackinnon, I'd like you take a step back and not just from the perspective of Green Mountain Power, but just big picture, how similar of an experience are other call them utilities or energy transformation companies, are they facing the same kind of challenges and trends and opportunities that Mary's talking about?

Mackinnon: Absolutely, absolutely, and I think if we look across the utility business in North American, I like to kind of say the industry is facing this kind of trifecta of challenges. You've got flat or decreasing demand for energy, you have increasing costs of maintaining existing grid, existing infrastructure, and then you've got this rapid increase in uptake of renewables and distributed energy resources. So I think it's absolutely a similar story across the board. What Green Mountain Power is doing is quite unique I think though in terms of the response and really kind of looking at the customer, as Mary pointed out. They're putting the customer at the middle, or at the center of the solution, which is something you see in other industries as a response to some of the disruptive forces that come into play. So I think that response is something to watch because we've seen success in other industries in terms of catering to changing customer demands and looking at customers not necessarily as a block, but looking at kind of the unique profiles of different customer groups, whether that be residential or commercial or whoever, and offering those solutions that are really going to meet those needs. Where I think it gets exciting for the utility industry specifically is once I think the connection with customers has evolved from where we are today and some of the emerging technologies are in the field and embraced and kind of at scale, it's the second and third order effects of those technologies coming together. How do you combine them into interesting solutions and services and then what does that enable the customers to do beyond that? So absolutely an interesting story I think across the board.

Moderator: Now, Mary, customer choice and customers are central to everything that you're doing in this transformation. Given that, how do you take the pulse of customers? What are the signals that you get that help guide you in terms of meeting the kinds of demands that you're transforming yourself to meet?

Mary: Yeah, great question, and it really does start with, I have to say I'm a big fan of the line culture eats strategy, and I believe culture eats strategy for breakfast, lunch and dinner, so the most important thing is the culture that you've built in your organization and really starting with some history of the company. I mean, we really started by transforming ourselves into a customer obsessed organization that loves our customers. We love them, we love them individually, we love them collectively and we're obsessed with not just what they say they want from us but what they value, and we're obsessed with delivering and innovating on solutions that they may not even want yet but that will bring them to that next level of the realization of what they value. So back to your question, you can't be customer obsessed, you can't be in love with your customers if you don't do a few basic things and do them like obsessively all the time, which is visit your customers, be with your customers, have an entire organization built on that kind of obsession with customers, survey them obsessively, poll them obsessively, get good intelligence about what they value. Learn quickly from things that you try that there isn't great uptick on and quickly pivot to new and different things. A huge part of how we've been able to do what we've done so far is, you know, some of it's the operating environment for sure of Vermont where there's a great energy community in Vermont, but another part of it really is around, again, creating a culture of fast, fun and effective, creating a culture of yes, not no. I think a lot of this industry's built on a culture of no, and I don't mean that in a negative way, just in a factual way of let's analyze things but oh my goodness it's complicated and not now, or maybe later or no. And so we've created a culture of yes, of fast innovation, fast fail move on to the next thing. So it's a bias for action, and a bias for action that is informed by what we've learned about our customers from getting intimate with them.

Moderator: Has anything surprised you about what you've learned about your customers?

Mary: No, no, I actually think what's been thrilling has been when you sort of hit those things that you think will be a home run and they are. One of the things that, yeah, I guess one of the things that surprised me, it wasn't so much about our customers but about sort of, we did this incredible, what I thought was really incredible energy transformation in a working class neighborhood in Rutland, Vermont and I was hoping that by now we would have had thousands of customers wanting to do that all-in transformation, and what we've learned is what we've known for a long time is no matter how easy you make it, the all-in transformation where you add in weatherization and efficiency and the complete and absolute transformation is so disruptive to customers' lives that it just takes, it's slower work that takes a lot of time to accomplish, however important it is and however much it adds to the value of their lives afterwards.

Moderator: Right, right, well you mentioned the word value and you're obviously getting to learn on a very intimate level what people in Vermont value in terms of your services. Mackinnon, I want to bring you back in and talk about some of the what you call, Navigant calls the energy cloud platforms and how they deliver value. Can you give a definition of what an energy cloud platform is and how that is a vehicle for value in the future?

Mackinnon: Sure, sure. Yeah, so from a platform perspective, what we're essentially look at when we look at this transformation occurring and trying to make sense of all the changes that are occurring across the energy landscape, we track from a technology standpoint to try to understand directionally where is this industry going and what technologies are being adopted, what does that mean. And what we're essentially looking for are where will we start to see a confluence of emerging technologies playing off of each other, and essentially a platform in our sense, the way we've viewed it, is where we see that confluence of technologies coming together. So there are seven that we've identified in some of our thinking across the energy landscape where this rapid innovation is occurring, starting to see the emergence of kind of, as Mary pointed out, kind of thinking through the customer and their changing needs, how do you cater to those needs and then offer new types of services that may move beyond energy from the sale of electricity as I pointed out at the top. So we look at integrated DER as an example, an integrated system of distributed energy resources. How do you manage that network? How do you optimize it? Make sure it meeting the needs of customers connected to that platform or involved there? We have transportation to grid and building the grid are similar concepts. We see a lot of vehicle electrification impacting the grid. There are ripple effects that flow out from that with respect to the oil and gas industry as an example, the auto industry. So you start to see a convergence of those interests coming together. Internet of energy obviously is related to the IOT theme that we see talked about quite a bit across the broader economy. And then smart cities is another example where, you know, I think a good example of looking at where you start to see, again, that blurring of lines across industries. Obviously energy is a critical kind of foundational component of cities and smart cities is where a lot of the traditional utility customers reside, but they have other needs as well and as you start to digitize these environments, you start to, again, as I

noted earlier, start to see that blending of services and opportunities for businesses that have relationship with customers to start to expand the aperture in terms of what they might offer to their traditional set of customers.

Moderator: Mary, I'd like to ask you a little bit about how Green Mountain Power is, you're serving customers, and at the same time in the future and today you're building and creating a viable Green Mountain Power. So what's the connection between how you're serving customers and additional revenue?

Mary: Yeah, and that's, to me that is the passion that we have around the socioeconomic future of Vermont, and to me it's the really important question that I honestly wish I heard a lot more dialogue about around the country. I don't hear enough dialogue about that. I think one of the unique things about our business model and our approach is that it really is, it really does come back to our love of Vermont, our love of the customers we serve and our belief that we can by earning our way into new value propositions in this space of disruption and providing new and different solutions that create new revenue paths, our North Star is that we're creating a business model and a system, an ecosystem, that can work that provides support to the fact that we are going to need this grid. Nobody is saying the grid is going to go away in the next few decades at least, and the cost of the grid is rising and the use of the grid is declining in the grandpa's grid way, right? And so we, I think, as an energy community, it is I think morally incumbent upon us to be thinking about how we balance this drive to a very, very different energy model, but to do it in a way that does not create huge challenges ten years from now with the cost of the grid and no traditional sales moving over it. So our whole model is built on the North Star of how do we earn our way into new value propositions, lead this transformation, reduce our bill to the region because we're becoming more energy independent in Vermont is one way to drive down the cost of the grid, but then also just to create new revenue streams within the regulated business to be shared with all the other customers we serve so that there is a virtuous cycle to this transformation and it's done in a way that is socioeconomically viable for the state of Vermont.

Moderator: So ultimately it's a win win for everybody.

Mary: Absolutely. I mean, that's the way I see it. I worry very much where I think utilities in many ways are adopting very traditional ways of dealing with this, they're creating unregulated subsidiaries that are doing the innovation, which is I guess awesome for their investor if it works. I don't quite get how that works for customers, right? I don't get quite how that works from a societal perspective where we create a model where the cost of the grid just continues to skyrocket while there's different forms of delivery. At some point there has to be more of reckoning around how do we make this work in a way that is viable, because we know, just like we've learned from landlines and cell phones, we know that there will be folks all over the United States of America decades from now that just want energy served to them the same way they're getting it today, so we need to make sure that the cost of that delivery is affordable.

Moderator: Thanks for that, Mary. Your experiences in Vermont are clearly worthy of study by the entire utility industry because sooner or later everybody's going to have to deal with some of the challenges and opportunities you're already contending with and you've provided a roadmap of what that looks like. I also want to thank Mackinnon. I think what's made this dialogue so unique is that Mackinnon has done a great job of giving us a big picture perspective of what the energy transformation looks like around the world, and combined with Mary's on the ground view of what's happening in Vermont, I think it's a rarely heard perspective on the energy transformation all of us are going to be impacted by in the future. But sadly that's all the time today. In our next episode we'll be taking a closer look at one of the emerging energy cloud platforms, and that's smart cities including building to grid. We'll be taking a closer look at the role of the utility in supporting smart city initiatives and the potential value that can be created by advancing clean energy in a low carbon economy, which is something that cities all around the world are contending with right now. For other episodes in this series, be sure to visit smartcitiesdive.com/electron.