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Insights About Energy as a Connector

KELLY O'BRIEN: Well, it seems like, during every conference, there always is some kind of unexpected program change. And here, unfortunately, one of the speakers today, Allen Leverett, the CEO of WEC Energy, is recovering from an apparent stroke that occurred just a few days ago. So, he's not able to join us. He is improving. So, we do ask that you keep him and his family in your prayers.

Despite this setback, the *Energy as a Connector* conversation will go on. I'm inviting back to the stage our Alliance Chairman, Paul Jones, as well as our speaker, Erik Birkerts. Thank you. Sure, round of applause.

PAUL JONES: Well, thanks everybody. And again, I want to point out that it's a shame Allen can't be here. He's an incredibly well-spoken individual with a lot of insight on what's going on in the world of energy.

We are very, very fortunate to have Erik with us today. He is the CEO of the Clean Energy Trust, and that doesn't really explain much. So, I'm going to ask him --

the way we're going to do this, I'm not a utility person. I sit on a utility board, but that's very different than being somebody that grew up in the industry. But I'm going to ask him to tell a little bit about himself, and to introduce the Clean Energy Trust to us. Then I'll ask a few questions that I have, and we'll have hopefully 10 minutes or so for you to ask questions as we go forward.

So, Erik, tell us about yourself.

ERIK BIRKERTS: All right. Well, let me say a quick word about Clean Energy Trust, just to ground the conversation. We are based here in Chicago. We are a 501(c)(3) not-for-profit, but our mission is to bring clean energy and resource innovation to life. We have a somewhat unique model. We make investments in companies that are coming out of either universities, or national labs, or also the proverbial garage.

Then we surround those companies with a lot of mentoring and venture development support. And then, we also work more broadly on fostering the ecosystem in the Midwest by working to connect various stakeholders, whether those are universities to investors, investors to startups, corporations to startups. We get involved a little bit on policy and advocacy issues that affect innovation. But the mission, again, is to help bring clean energy and resource

innovation to life.

We were founded in 2010 by two Chicago business people and civic leaders, Nick Pritzker and Michael Polsky. They are my board co-chairmen. And really, at the time, the motivation was, there was a recognition that the Midwest has tremendous assets. We have world class universities across the Midwest, with exceptionally strong science and engineering programs. We have national laboratories. We have a deep concentration of Fortune 500 companies that make stuff. And then there's a really strong population of STEM graduates. So, all the ingredients were there for the Midwest really to be a leader in clean tech innovation.

But, there was also a recognition that the market was somewhat fragmented. It wasn't as concentrated as what you might see in Silicon Valley, or what you have in the Northeast. And there were symptoms that that was a problem. Venture capital -- the venture capital in-flows to the Midwest were dramatically less than other parts of the country, even though we should be punching above our weight. Clean Energy Trust really was formed, and our work is to address those breakdowns that are taking place.

MR. JONES: What about yourself?

MR. BIRKERTS: Yeah, so, I actually began my professional career at the Federal Reserve Bank, but the

New York Reserve Bank. I began in finance, and then migrated to Chicago to get my business degree. The reason I bring this up is just, I came to sort of the clean tech sector from working in industrial products. I did a lot of consulting in industrial products. I actually noticed at one point you were at Greenfield Industries. My first consulting engagement was with Greenfield Industries which is a cutting tool manufacturer. But, what I found myself --

MR. JONES: That was a long time ago.

MR. BIRKERTS: I found myself working a lot with products such as motors, and pumps, lighting systems, drives. And what became apparent was that, rather than selling these pieces of equipment on the merits of feeds and speeds, and sort of traditional performance metrics, that you could actually craft a fairly compelling economic argument. And that was around, if they were energy efficient products, you could demonstrate through math, through finance, that these products could pay for themselves in a very short period of time.

And you could also construct financing contracts around that. So, that's sort of how I got pulled into the whole clean energy sector, and was fortunate to be part of a company that went public. I was on the management team there. And then, when it came time to do something else, I

kind of felt a desire to get involved with raising a sector versus just trying to make a single company successful.

MR. JONES: When you and I talked on the phone a few weeks ago, you had some pretty good examples of some of the things Clean Energy Trust has been doing. I think everybody would be interested in hearing a couple of those stories that kind of sum up what really happens when you folks go to work.

MR. BIRKERTS: Yeah, so one of the challenges is that a lot of, whether you're looking at energy technologies, resource technologies, some of it is software-based, but a lot of it is rooted in hard science. And the people working on these innovations are scientists and engineers. They don't always have a background in business. They oftentimes don't have a background in finding out or figuring out how to support themselves financially, and how to support their innovations, leaving the lab and reaching the market.

Oftentimes, they can write -- you know, they can get federal grants. But at a certain point in time, those grants end, and private capital has to come in and take the place in non-diluted financing. And that's always a tough spot for a lot of these innovators, because they're not -- their passion is the science or the engineering, not

necessarily the business. So that's really where our leverage point is. We come in, and we help with providing seed funding, but also surrounding them with mentorship and support.

And then also, activating our network to introduce them to investors, or customers, or other resources that they might need, such as test beds, or pilot sites.

MR. JONES: Can you talk about some of those, a couple specific examples?

MR. BIRKERTS: Yeah.

MR. JONES: Without giving away any trade secrets?

MR. BIRKERTS: Yeah, yeah. No, I mean, it runs the gamut. We have -- Northwestern University actually has been great in being able to take some of the intellectual property develops within the university system, and coupling students interested in entrepreneurship around that intellectual property. And we have two companies that came out of their material sciences program.

One is a -- it has a graphene technology that is going into advanced batteries to basically make batteries last longer, and charge faster. And they have a terrific partnership with the automakers. There's something called the U.S. Advanced Battery Consortium. They're working with Ford, General Motors, and Fiat Chrysler to try to address

the issue of, how do we improve battery performance, so that electric vehicles really become a part of our future.

Another one of these Northwestern companies has something known as a metal organic framework. It's an atomic sponge. But basically, it allows the storage of an enormous amount of gas without an enormous amount of pressure. So, not only is it safer, but you can also store compressed natural gas, but also harmful gases that go into various semiconductor manufacturing and other types of processes.

Again, both those companies have been started by students who were paired with university I.P., and they've both gone on to raise millions of dollars in venture capital. They, I think each employs around 15 or 20 people, and they're growing quickly, and being recognized. So, not only are these technologies going to benefit, whether it's industrial processes, or even the environment, if you take the instance of a battery, but they are creating really good, well-paying jobs. So, there's this economic development component to all of this that's really, really important.

MR. JONES: So you take a lot of technologies, and things that could work, and go find someplace to put it to work. Do you ever work the other way? Where, if somebody

comes to you and says, "I'm starting up a manufacturing business to make widgets, and I want it to be the most efficient, greenest building on earth."

MR. BIRKERTS: Right. Well, the way we play in that realm is, so we work with some large corporations. We recently finished working for Cummins, which is a large engine manufacturer. But they have a huge portion of their business in the electric power sector. And they are watching what's happening in this sector. And they need to be aware of, how is that sector changing? What technologies should they be tracking? Which technologies should they be placing bets on, and making investments in?

So, we act -- our organization acts as a technology scout for them. We activate our relationships across the different incubators, accelerators, and venture capital firms, and universities, and national labs to identify where technologies that can have a really meaningful impact, either positively or be really threatening, to companies and business. We do that. We've done that for Exelon. We've done that for American Electric Power. Archer Daniels Midland is another company we've done that for.

MR. JONES: You're well-connected to a lot of companies. What -- I'm going to shift gears a little bit

here. And thanks for the update on what your company is doing. But you're close to the utility industry. What are the trends that you see? What are -- you know, we all talk about renewables, and you know, that could be hydro-electric. It could be solar. It can be wind. Give us your perspective on where we've been, where we are, and where you think we're going relative to reducing, frankly reducing the carbon emissions, specifically coal-fired power plants?

MR. BIRKERTS: Well, I think it's readily apparent that the electric power sector, the utility industry, is under tremendous change. Disruption perhaps is the word people use. But, when you look at what the drivers are behind that, it's not really the war on coal. It's not solar. It's not wind. It really is, at the end of the day, natural gas pricing.

Just the extraordinary low level of natural gas pricing brought about, in large part, by federally-funded research and innovation. Which is a good thing, but that pricing is making large coal-fired and nuclear plants near uneconomical to run. So, that's causing a huge amount of disruption in the industry.

And then, if you look at, and this is more pronounced in certain regions and territories than others. If you

look at distributed energy resources, such as solar. If you look at what's happening in California, the proliferation of rooftop solar basically means that in the middle of the day, most power is being generated at the source, and not by the utility. And those are also the most -- historically those have been the highest volume, most expensive hours of the day, so they are gone from the utility.

And there's a phenomenon known as a "duck curve" which basically describes that during the middle of the day, the load drops to near nothing, and then it climbs steeply in the early evening hours. And that's the neck of the duck. But, that's creating tremendous disruption in the industry. But, you've also seen overall energy intensity and energy consumption has declined fairly consistently over the years due to energy efficiency.

And then another trend that is causing interesting dynamics is, more and more corporations are electing to procure renewable energy directly from project developers. So, in essence, they're contracting directly with a wind farm operator, and not taking that here. They're not sourcing their power through the utility.

So, all of that is creating disruption. If you speak with almost any utility in the country, they are all

undertaking massive projects, strategy projects, to try to envision what the future holds for them.

MR. JONES: You know, when I was -- I'm on the board of Wisconsin Energy Corp., but before that I was on the board of Integrys, here in Chicago. And we have a fairly large business that would literally go put in solar units for a company. We were all over the country putting in solar powered -- providing them power during the day, which is the peak period, so they could then go and renegotiate their rates with the utilities.

Tell us -- I'm going to put you on the spot. How do you think -- utilities are all either changing on their own or being forced to change? How do you think they're doing really as far as -- Al was out here to offer his perspective, but I'd love to hear what you have to say about how they're doing.

MR. BIRKERTS: Well, it's interesting. I think five years ago, if you looked at what was happening inside utilities, it would have been pretty staged, pretty conservative. I don't think the word innovation really would've -- you wouldn't have heard that word very often inside the walls of the utility.

If you look at what's going on today, they are really working hard to rethink their businesses. I think the

challenge is, there's the business realities of redesigning your business model and your business strategy. But they are still being handcuffed by a regulatory structure that I think is yet to keep pace with where they need to go.

So there's a disparity between what they want to do, what they want to test, what they want to pilot, and what they're actually allowed to do based on the regulatory structure that's in place. And that's creating some problems. So, not only does the utility have to redesign itself, but the public utility commissions, and the regulatory structure has to change pretty dramatically.

MR. JONES: I can tell some stories about at every board meeting, we have conversations about the public utility boards. And some of them, they're still doing things the same way that they did 20 years ago, and we're trying to change things a little bit.

Tell you what, I've asked some questions. Let's open it up to the audience, and see if you have some questions for Erik. He's the expert. If you have some for me, I'll take them too. Do we have a microphone for here?

MALE SPEAKER: You're a not-for-profit and yet you have a portfolio of investments. Is that my understanding?

MR. BIRKERTS: Yeah. So, that's right. There's a couple -- one, the reason we're able to do it, and not fly

counter to IRS guidelines, is that the investments we make are aligned, and in keeping with our mission.

MALE SPEAKER: Why aren't you just not a for-profit corporation, an investment bank specializing in renewable energy?

MR. BIRKERTS: Good question.

MALE SPEAKER: What's the advantage?

MR. BIRKERTS: It's a little bit of a longer -- but in order to -- well, first off, we are evaluating a for-profit return-oriented fund. But the reason we haven't done it yet is, one of the challenges with a structure of a traditional venture capital fund is time horizons. They have to deploy money quickly, and then seek to start seeing repatriation with returns.

MALE SPEAKER: You don't have to. You can set it up any way you want.

MR. BIRKERTS: But we had a -- we have a longer time horizon. And so we can invest, and stay with companies for 7, 10, 12 years without feeling the pressure to meet the time horizons of the fund in order to satisfy our limited partners.

MALE SPEAKER: Okay, I understand what you said. Thank you.

MR. JONES: Any other questions? There's one back

here, two back here. Getting your exercise.

FEMALE SPEAKER: Certainly Northern Illinois has a large concentration compared to the nation of nuclear energy. And I know you talked about nuclear and coal, and not lumped them in the same category. But, we just saw some legislation that was really maybe a short-term viability fix for nuclear. What do you see nuclear energy long-term in our region?

MR. BIRKERTS: Is this one of the moments where I should say that the opinions expressed are mine, and not the organization I work for? But, I think the reality is, is that nuclear power definitely has a place, and needs to maintain a place in our generation mix. If you look at renewable power, most of the new capacity additions have been renewable, of late. But if you look at what that translates to, it's still only around 10% of total generation.

So, where's the other 90% going to come from? I vastly support nuclear power over coal. It is cleaner. You've got a waste issue, but it is a cleaner source of power. From my standpoint, from the innovation standpoint, I think there's still a lot of interesting things that come about through innovations surrounding advance nuclear, both fission and fusion. There's work being done there, and I

think some of those could really be the key that unlocks a lot of the big greenhouse gas reductions that need to take place.

MR. JONES: There's another question over here.

MALE SPEAKER: I know that Indiana recently passed some legislation to effectively make it more expensive if you purchase and install solar panels in your home. What do you think the long-term outlook, if any, would be for these solar energy markets in Indiana because of that?

MR. BIRKERTS: It's -- the issue -- this was fairly pronounced in Arizona, as well. The issue is that the infrastructure still needs to be there for providing reliable power. Somebody needs to pay for that. If you're essentially going -- deriving most of your energy from solar, you're essentially being subsidized by other rate payers for that infrastructure that acts as your backup.

So that's the crux of the problem. That too, I think, is indicative of a regulatory structure that hasn't fully figured out how to appropriately price those types of scenarios. I think there's a middle ground where solar users probably still need to pay for some of that capacity, or some of that network, and capacity that they rely on. But, exactly how to best effect that, I think, nobody has figured out yet.

MR. JONES: Other questions? Okay. Hearing none, I want to thank Erik very much for giving us a fairly precise --

MR. BIRKERTS: Thank you.

KELLY O'BRIEN: So, just a few minutes. Economic development people from Kankakee and Will County are here. If you could please meet me during the break, right outside the room, I would appreciate that. Number two, I want to let you know that many of you are familiar with the fact that we are very supported by a group at Purdue that embraces Strategic Doing. If you're not familiar with Strategic Doing, it is a very effective program for helping networks create agendas, and get projects and initiatives to the finish line.

So, we are going to have a meeting on January 24th. So, if you can mark your calendars for January 24th for a Strategic Doing meeting, where we will be looking at organizing the agenda for 2018 for the Alliance.

And then number three, as we are approaching the home stretch in today's program, in a lot of ways I did kind of save the best for last. And so very shortly following our break, we have one of the senior department heads from USDOT here to talk about what's happening with infrastructure investment. And then we'll have our

workforce leaders talking a very innovative program that they have collaborated on, and received a U.S. Department of Labor grant on.

So, these are not things that you want to miss, including the fact that then there's a cocktail reception. So, of course, being an Irish girl, I have to encourage you to stick around for the cocktail reception.

But, while we are going to take a few-minute break, when you come back, I encourage you to move where you're sitting for two reasons. Let's kind of all gather more towards the center of the room, and it gives you an opportunity to meet some new folks.

So with that, we're going to take a few-minute break, and we'll be back here at 3:15.

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