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ENERGY

BEYOND THE ELECTRON PODCAST

Smart Cities and Building-To-Grid

Moderator: Columbus Ohio competed against 77 cities nationwide to win the 40 million dollar smart city challenge from the US Department of Transportation. San Diego is deploying electric vehicle charging infrastructure to lower its carbon dioxide emissions. From Amsterdam to Shanghai municipalities are engaged in a wide variety of smart city efforts aimed at making life better for their citizens, creating clean energy jobs and forming a more resilient and sustainable economic growth platform.

Definitions of what constitutes a smart city vary but they universally embrace a lower carbon economy, the smart use of technology, predictive data analytics and a closer connection between utilities, transportation stakeholders and the built environment. As part of this a new form of collaboration is necessary. We're going to dig into those topics and more on this episode of Beyond the Electron, the Energy Cloud podcast series. I'm your host, Chris Warren and I'm pleased to be joined today by three experts whom I'm sure will give us valuable insights around the nexus between smart cities and the energy cloud transformation.

With us today are Jerome Davis, Regional Vice President at Xcel Energy. Based in Denver, Jerome heads up Xcel Energy's local government affairs operations and spearheads relations with city, county, commercial and industrial customers throughout Colorado.

Also joining us is Nadia El Mallakh, Colorado community and customer partnerships lead and assistant general counsel. Also based in Denver, Nadia works closely with Jerome and his team including spearheading a new community collaboration model that Xcel Energy has pioneered. It's a model that focuses on advancing its community's energy related goals.

And finally Rob Wilhite, a managing director in Navigant Consulting's Energy Practice. Rob brings us over 30 years of experience in the energy and utility sectors and currently directs global business strategy, policy and regulatory activities. We obviously have more brain power and experience here than we have time so I'd like to welcome you all and jump right in.

SPEAKER

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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: Rob, I'll start with you. Can you talk a bit about the common drivers that are reshaping both the energy industry and cities? Clean energy is obviously one of them and a low carbon economy, what else?

Rob Wilhite: Well, thank you Chris. Let me answer your question by first stating that Navigant is actively tracking more than 350 projects spanning 221 cities across the world. Therefore, I would summarize common drivers for smart city programs based on our observations into three primary dimensions. The first of which is environmental sustainability. This usually includes programs that focus on building energy efficiency, greenhouse gas reductions and circularity. In fact, the concept of circularity is about creating new value chains that decouple economic growth from the uses scarce in linear resource inputs. That's number one.

Number two is citizen wellbeing. Many smart city initiatives we're looking at also focus on programs to improve public safety, education, healthcare and social care. In fact, one such example is the use of advance sensors in location tracking technology to enable rapid identification of gunshots to a dispatch authorities more quickly to the source of the sound.

The third common driver is economic viability. This is a key driver for most cities to catalyze new investment, create jobs and spur increased innovation within their municipality or region. Usually there'll be both a short term objective to ahead and incent initial programs but also couple that with long-term and sustainable outcomes for the broader perspective.

Moderator: Thanks a lot Rob, that's obviously a much more expansive definition of smart cities than just reducing greenhouse gasses and promoting clean energy. Jerome and Nadia, let's pivot to you.

You're out in Denver and you're focusing a lot on the customer. Can you tell us more about Xcel's new initiative, Our Energy Future?

Jerome Davis: Sure, thanks Chris. If you step back about three years we embarked on a strategy here in Colorado that really tried to be visionary and we tried to look at it from, imagine a day when our customers have more control over their energy and can design a plan that best suits them and the needs that they have. With that we sort of came up with three tenets under that viewpoint. One was power and technologies and that was really what emerging technologies were out there that'll pave the way for the company to transform and modernize. The next one was powering the economy and that meant a modern grid that would foster cutting edge technology and efficiently deliver all types of energies to customers while helping to grow the economy in the state they would live in and the last one which is really the most important one, at least as I viewed it, was empowering customer choice and really allowing the customer to have the viewpoint of what it wanted from a utility.

We understand that we're a regulated monopoly and that the business really is they can only work with us. What we wanted to do was to make sure that even though they work with us we didn't want our customers to feel captive and the way to do that was to make sure they had various options that they can have in terms of the service from us. Imagine a day you call up Xcel Energy. You just move in here from, let's say you just moved from California, moving here to Colorado. We have a lot of Californians move here, thank you very much, and they move here and they call up to get service.

The customer service agent responds saying "Welcome, thank you very much for being a customer here. Can you tell me your address?" Then the follow-up question is "Well, great, can you tell us what kind of generation resource mix would you like to have? Would you like to have solar, wind, natural gas, chilled water" and so forth. If they say "Well, what do you mean? What if I say I want solar?" Then we say "Well, tell us what type of solar you would like to have. Do you want rooftop solar? Do you want community gardens type solar or you want universal scale solar" and then their agent would go back and forth in terms of explaining the differences, not in a way where we lead them one way or another but in a way where we just education and open up here are your options and whatever best fits for you, it's your choice.

Jerome: This was extremely important from us in how we did this because what this did was really opened up the communication in terms of also opening up the education of our customers about many of the good things we were doing to move our business because I our business, you know what, the customer thinks about us a couple of times a month. They flick on the switch and they expect it to be there. If it's not there it's typically not a happy moment for them and then when they get their bill. We've often seen that no matter what they do throughout the weekend, the month when they get their bill it's never low enough based on the conservation efforts that they have done over the past month. We were really looking for opportunities to really move it to a different level in how we engaged with our customers.

Moderator: Thanks Jerome, so it sounds like a lot of what you're going to do and are doing now is going to require more coordination and collaboration between customers, and utilities, and policy makers and regulators. I'm wondering how you're driving that now and what your priorities are.

Jerome: Certainly Chris, if you fast forward to where we are right now in 2018 we really have three strategic priorities from a corporate perspective that we have focusing on and these are all follow-up on our energy future. Those priorities are, right now, keeping bills low. That's extremely important because no matter what we do and what we've learned in our business our customers want and expect the energy to be there when they want it and when they need it and they want to keep those bills affordable meaning they certainly will see some increases but we want to keep them in check with inflation. If we look at our bills over the past four years, residential customers bills have went down 9% which is very hard to find anything else out there that has went down in that same time period and our bills in terms of our competitors even better for our customers.

The next important piece there is us leading the clean energy transition and certainly I can talk more about that in terms of what we're doing with our fleet, and how we're doing it, and how that's powering economic development and providing even more customer choice. One of the more important pieces here is about enhancing the customer experience and this is just a follow-up on empowering customer choice and how now more broadly how we are working in close partnership with many of our municipalities, large customers about how we get them to the point of where they want to be. Depending on whatever their aspirational goals are we help them get there so I'm really excited about our program that falls up under here titled Energy Future Collaborations, really being led by Nadia and she'll talk in more detail about it but I think it's a good transition to just hear from her on that piece of this strategic priority.

Nadia El Mallakh: Chris, Jerome just outlined in broad strokes our new Energy Future Collaborations or EFCs as we finally call them which are indeed a natural extension of our energy future with a focus on our municipal customers. What the EFCs do is create a framework to proactively work with our communities in advancing any of their local energy related goals and one key driver is that this would be in spaces where we have mutual alignment. It's important to also note that this is all within our existing state regulatory model and we've been doing this through memorandums of understanding also known as MOUs where we establish values, mutual vision and key guiding principles that detail how we can work together in advancing those goals.

The guiding principles or tenets are very important and some examples of those include avoiding cost shifts to non-participating customers, scalability and support for local, state and federal policies where we, again, see alignment. A couple of things to note, this approach is different than you've seen energy companies and their customers/municipalities partner in the past and the reason it's different is because it's not born out of a contentious situation. It is not a situation where you have a franchise renegotiation that isn't working out. It's truly a proactive partnership where we're sitting down with our communities to better understand their goals and objectives and that can be in areas of economic development to environmental and sustainability objectives to also smart city technologies and how we might be able to do pilot projects.

That's just a high level overview. Once we create the MOUs we then are turning to work plans which have detailed outlines about the community's priority projects, how those are going to be financed, objectives, what regulatory approvals we might need and the like.

Moderator: Jerome and Nadia, you guys are involved with this work on a day-to-day basis. Can you talk through some of the best practices you've observed in your work?

Jerome: Sure, thanks Chris. I think if you look at it broadly to be able to provide best practices you got to be able to have the products and services that the customers want. One thing that we're hearing more and more is that our customers are asking for more green in terms of how their energy's provided to them and that momentum continues to just grow. They have variety of reasons for it. Our role is to enable it and so we just last year introduced the Colorado Energy Plan which is a transformative step towards a clean energy future, really tremendous. At the end of 2017 we had a renewable energy portfolio of about 28%. Under this Colorado Energy Plan we're aiming to be 55% renewable by 2026 and to reduce carbons by 60% from our 2005 levels if this plan is approved by the commission later on this fall.

Just a little bit of what goes into that, we're talking about the early retirement of about one third of our existing coal, fire generation. We're going to bring in new diverse energy sources and technologies including 1,100 megawatts of wind, 700 megawatts of solar, about 275 megawatts of battery storage and 380 megawatts of natural gas resources. The battery storage technology is really exciting. When you look at that if you were to look at all of the battery storage technology that was brought on the system last year in the United States in the energy sector this one project surpasses it in itself so we're really excited about what that piece brings in there but when you look at all of this and what it's going to be, it's going to be a two and a half billion dollar investment in the state of Colorado and we'll be keeping bills either neutral or lower. That is a win, win, win, win, all around for everyone and so when you say "What are the best practices of what customers want" think broadly about what we can bring to the table and then I think when you hear a little bit more about energy future collaborations what are some of the things that our customers are asking us for within these discussions and how this Colorado Energy Plan is enabling us to meet their needs.

Moderator: Let's go to you Nadia. From a community perspective what stands out to you as the most important best practice?

Nadia: Jerome and I would add that one key theme that we heard and what you just talked about with the Colorado Energy Plan and our Energy Future Collaborations is really listening and being proactive. I should say two key themes. One takeaway is trying to really step back and understand what our customers are telling us, whether that's a large commercial and industrial customer, a municipality, a residential customers, we are really trying to listen to what they have to say, and step out, and do things differently and be proactive. On the community front, taking it back to the energy future collaborations we have really seen a positive response from our cities and towns. They're actually, although we've had historically very strong relationships with them they're very pleased to see us coming to them and saying "How can we work together" and having that opportunity to better understand what they want to achieve.

They're telling us "We want to go from point A to point B but we don't know how to get there." This allows us, from a best practice standpoint, to have a seat at the table and help education as well on our end to say "Here's some more detail about our regulatory construct. Here's why it would be important to say", if we're talking to a community, any community, say Breckenridge, "You don't necessarily want to pay for what Denver's doing and vice versa." Things like ensuring that cost shifts don't occur to non-participants and that really resonates with our customers.

Just from a best practice standpoint I think looking at also how we can align companywide programs and projects that we have with our customer's needs. For example, the Colorado Energy Plan that Jerome was talking about. Here in Colorado we have many communities that, say, have 100% renewable. I shouldn't say many, maybe a handful of communities that have 100% renewable energy goals so when we're talking to them we always highlight the costs and technological challenges but we also say "You really should be building upon our base system." If we're 55% renewable by 2026 how do you build upon that to close that incremental gap.

Moderator: That's a really good, on the ground perspective from Colorado. Rob, can you give us a broader view of things around smart cities? Are there any specific examples around the globe about how collaboration is working to make smart cities possible and also ho are utilities uniquely positioned to drive some of those efforts?

Rob: That's a good topic Chris. Let me start out by first setting the context for this view by at least giving you the Navigant definition of smart cities and this capitalizes on the responses I gave to the previous question. First of all, from our view a smart city is characterized by the integration of technology into a strategic approach to sustainability, citizen wellbeing and economic development. Now, this definition centers on policies and desired outcomes rather than on the smart services, or infrastructure, or even technology alone.

Having offered this definition there are examples across several global geographies where utilities are playing a key role in driving or even supporting smart city programs. As referred in your opening remarks Chris, AP is one of the several partners to sing onto the challenge with the city of Columbus in the Smart City Challenge grant that was awarded a couple of years ago. This collaborative is focusing on modernizing the transportation network and reducing carbon emissions in both transportation and the electric power sectors. While this partnership focuses on central Ohio the lessons we are taking away will benefit all of American electric power and the municipalities that they serve.

A second example is part of the development for the London Olympics in 2012. French company, Engie, developed a new energy center for what is now called the Queen Elizabeth Olympic Park and this low carbon district energy network was designed, financed and constructed by Engie to serve the venues during and after the Olympics. In fact, more than 100 million pounds was invested by Engie and that will be recouped through the sale of heating, cooling, and electricity under a 40 year concession agreement.

Chris, to the last part of your question I'll some up by stating that utilities really are uniquely positioned to lead such multi-stakeholder engagements for three key reasons. One, they really understand the intersection of the energy and environmental impacts associated with buildings, transportation, water and waste, agriculture and manufacturing. Number two, utilities have a strong ability to meaningfully plan and implementation infrastructure at large scale and finally utilities bring the ability to reach multiple stakeholders across communities and wider city regions.

Moderator: Okay Rob, let's talk a little bit about a topic I know is of interest to a lot of people. It's the idea of building to grid platforms. Can you talk a little bit about how Navigant looks at that, how it defines it and why building to grid matters?

Rob: Yeah, certainly Chris, building to grid, from our perspective, really describes the nexus between connected building infrastructure and the power grid. A typical B2G facility includes integrated controls and automation over internal systems from lighting, to HVAC, to plug loads and even people movers just to identify a few examples. Building to grid also supports energy assets such as on site solar photovoltaics, battery energy storage and even electric vehicle charging infrastructure.

Now, Navigant expects more than 50 billion dollars to be invested in building to grid, integrated energy assets for both residential and commercial building customers over the next five years. In fact, software's expected to account for at least half of that investment in intelligent buildings by 2020. Software analytics is in fact going to be the cornerstone of the intelligent building transforming facilitates into dynamic energy assets for the grid.

Chris, to the second part of your question on why does this matter, well energy companies and utilities can leverage smart connected homes and building solutions to deploy new strategies and channels for customer engagement. In fact, new value added services from energy companies can provide channels to support commercial and industrial customer participation in building to grid connectivity. There's also bottom line grid benefits to participation for the utility including ancillary services and avoided power grid upgrades.

In fact, building to grid orchestration in fact even creates new customer offerings including advisory services, engineering support and even technology implementation that utilities could offer directly to their commercial and industrial customers.

Rob: One last point regarding building to grid. Justifying building to grid investments through energy savings along is usually insufficient to attract the interests of today's building owners and operators. One needs to really take a broader approach that considers productivity improvements, operational benefits such as comfortable and convenience and environmental benefits especially reduced greenhouse gas emissions.

Moderator: Really an expanded definition of this relationship is important and so is the whole idea of a platform which you've outlined already with the role that utilities have and is creating these platforms upon which so much innovation can take place and so it's an interesting dynamic and it makes me wonder. It's impossible to predict everything in the future clearly but when you think about an optimal building to grid relationship, and how that looks, and who's involved, and what the perspective of the utility, and customers, and society as a whole, what that is, what does that look like? Are there hints out there that say "Yeah, this seems to be at least the outlines of a model"?

Rob: Yeah, I think so Chris. We see that relationship enabling several benefits that really align well with many smart city drivers we spoke about earlier. First, energy efficiency and greenhouse gas emissions reductions can really be achieved more substantially via reduced building energy consumption during peak periods especially from building to grid connectivity. Now, this also lower electricity generation from the fossil fuel peaker power plants that utilities and continuously deliver ongoing energy savings and cleaner, more sustainable operation.

A second key benefit of the optimal building to grid is, at least from the utility perspective, is enhanced power system reliability. Since the utility will have greater insight into real time customer energy use across its network it'll also be in a position to manage customer energy use when the grid is constrained as agreed to by customers.

Finally, a third key benefit from this optimal building to grid relationship is from the perspective of customers and that's improved satisfaction due to increased options that are enabled by innovative technology solutions for both the smart connected home and commercial buildings. Increased visibility to real time energy use and power demand combined with advanced analytics and resulting insights enables building owners to direct operational improvements that will drive cost savings and increase comfort.

Moderator: Thanks for a great conversation Jerome, Nadia and Rob. Just a few thoughts to wrap up. If you're in the utility and energy space you obviously hear a lot about the energy transition that's underway and while it's important to focus on what it means to the grid and to utilities it's also important to remember that this is a journey that isn't just about the energy industry. It's also about engaging communities to imagine and build their own future which is a lot of what Jerome and Nadia spoke about and it's about understanding that utilities can't just talk about customer engagement. They also have to go out and actually do it every day. That presents plenty of challenges and it also presents lots of opportunity so we'll see how that all plays out and how smart cities develop and that's it for this episode. Until next time, I'm Chris Warren and this is the Energy Cloud podcast series.