



utilities recognize that successfully addressing market externalities requires advancing internal capabilities for technology scanning, customer behavior, solutions development, platform interoperability, and business model design. These challenges necessitate innovative thinking and creative approaches to business execution.

At the June 2019 Edison Electric Institute Annual Convention in Philadelphia, Nick Akins from AEP, Warner Baxter from Ameren, Chris Crane from Exelon, Leo Denault from Entergy, and Tom Fanning from Southern Company, joined Strategy& and *Public Utilities Fortnightly* for our third virtual innovation roundtable.

As is typical when leading CEOs discuss industry challenges and strategies, some common themes emerged.

Embedding a Culture

A common theme addresses culture – not just individual emphases, but step-change in enterprise attitudes. The CEOs collectively focus on creating a workplace where employees feel comfortable embracing innovation and believe they individually thrive in this environment.

The CEOs recognize embedding a culture of innovation takes years and employees look for signals of commitment. Employees want to see innovative thinking is appreciated and celebrated rather than devalued and penalized.

These companies create environments where imaginative thinking and smart risk-taking are encouraged. Some use formal

competitions to illustrate intent, while others charter informal exercises to motivate employees to collaborate to solve problems.

The New Hubs

Some companies initiated their innovation models in 2014-2015 and have evolved beyond their initial focus. Several have taken further steps to create formal centers for ideation and innovation activities.

The common result of these actions has been stand-up of discrete innovation hubs within companies. The intent of these hubs is to solve problems, advance market offerings, and/or engage

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– Tom Flaherty, Senior Advisor to Strategy&, part of the PwC network

Nick Akins

CEO, American Electric Power

Tom Flaherty, Strategy&: Summarize the innovation efforts that you’ve accomplished over the last several years.

Nick Akins: Our innovation efforts have been substantial. To help drive discussions and policy objectives around innovation, we decided to have our own IllumiNation Energy Summit, which we held in Columbus in May.

The IllumiNation Summit was focused on regulators and policymakers and was designed to give them a hands-on experience interacting and discussing technologies in the energy space. We wanted to spur thinking about how these technologies might benefit customers and how they apply to electric service providers, because our industry needs to be focused on innovation.

We talk with lawmakers and regulators a lot about technology and innovation but is it difficult for them to visualize what we really mean. The IllumiNation Summit was designed to show the possibilities that advanced technologies can provide. We built an entire “city” within the convention center to demonstrate evolving technologies – from electric mobility to Google in the home. The idea was to demonstrate the scope of new technologies that

electric energy providers can help deploy. We also wanted to get them thinking about innovation and opportunities for residents in their states and how electric energy providers can help make that innovation happen universally.

Beyond the IllumiNation Summit, we are focused on identifying innovative thinking around the globe. We are the only U.S. company that is a member of Free Electrons. Free Electrons identifies innovation in our industry on an international scale. They seek out thousands of startups and innovative thinkers worldwide and then give about fifteen innovators an opportunity to pitch their idea to electric providers from around the globe. The electric energy providers then partner with the startups to more fully develop or deploy their ideas.

We sponsored and hosted an innovation pitch opportunity for Free Electrons at our offices in Columbus in May. It was an opportunity for us to engage directly with startups and other smaller companies that are focused on developing the technologies of tomorrow.

Several years ago, we saw that technology was moving at a



From left, AEP CEO Nick Akins with Tom Flaherty, Strategy&.

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different pace and in different directions than we might have envisioned. We quickly realized that different individuals and companies were approaching the issue of electrification, the development of new technologies, and how to deploy those technologies to customers differently than we were. So, we decided we needed to tap into that type of thinking.

We have about nine technology pilot projects happening right now across our company. The goal is to evaluate new ideas and determine if they will work on the scale that would make sense for a company like AEP to deploy. It's a fascinating process. Every pilot, every discussion we have with these individuals makes us think of about fifteen additional possibilities.

For example, we've been working on a pilot with a company called Relectrify. Their innovations are focused on battery technologies and how to discharge cells and how to use power electronics to make the cells last longer. We were thinking this technology might provide ways to deploy batteries as energy storage devices for a home.

Fast forward a year later. We're now working with a different company that is focused on putting energy storage within a plug-in device. So, you have a toaster, but you also have a plug-in device that provides storage and information flow and allows you to control and get status from the device. This company even has a storage approach for a device the size of a refrigerator. It's a fascinating

concept bypassing the entire approach of centralized storage within the home, which we thought was a distributed approach, and evolving it into plug and play which is even more distributed.

Technology innovation is moving quickly, and we have to adapt and respond to our customers and what they're asking us to do in a very meaningful way. But the only way we can do that is to stay ahead of innovative thinking and understand the directions people are going.

There's no question that energy companies and the technology providers now see the mutual benefits. We know we need one another to move forward.

In the past, the energy companies have said, we're used to doing everything. We'll do it. At the same time, the technology providers had been saying, no, we can do it. They now understand that they don't know everything about our business. And, we know that we don't understand everything about technology and the way people think. So, we've got to adapt and work together to advance.

These suppliers want to partner with us because they see the ability to interface with the grid and the scope and scale associated with it. They want us to invest in their companies, which we are in some cases. Investment provides an opportunity for us to use our scope and scale, reduce the cost of technology and innovation for everyone, and then drive the policy objective of

universal access to new energy technologies. That's where the electric energy companies provide significant benefits, because no one else can do that.

No one else can be the convening authority to help drive these types of technologies toward quick adoption. If you want to achieve climate change goals or advance innovation that will save energy or improve lives, the quickest way is to have the electric energy company facilitate universal access.

PUF's Steve Mitnick: We probably need some different kind of innovations with the regulators. That's an important part of this.

Nick Akins: That's a key point. What we tried to do with the IllumiNation Summit was show regulators and lawmakers the emerging technologies, and at the same time, encourage them to think about it in the context of, can the electric energy company bring these benefits to our state?

During the summit, there was a vibrant conversation, really a debate, among regulators about what role the electric energy company should have in advancing these technologies and what our industry should be doing in this space. That was the type of engagement we wanted to happen.

Ideally, we'll end up in a place where the local electric energy provider is not precluded from advancing technologies. At the same time, we hope regulators and lawmakers will understand the advantages for customers if the local electric energy provider can adopt and provide universal access to these new technologies.

The future of this industry is going to be about providing continuity of service. We're not just providing a line going into a home. If you think about it from that perspective, that supports a plethora of different devices and services, including storage, transportation and more.

We're seeing some evolutionary thinking from lawmakers and regulators. For example, in Virginia, there is now legislation that allows us to conduct a pilot project to bring broadband service into a rural area. In the past, the local electric energy provider had been precluded from providing broadband, but because we're putting in fiber optic networks to support advanced grid and meter status and analytics, we have the ability at the same time to bring broadband into areas that currently don't have access.

In our Virginia and West Virginia territory, thirty percent of our customers don't have access to broadband. That is concerning and prevents those customers from truly participating in the digital economy. It really becomes a higher calling for our industry. Not just providing electricity and other services, but also looking at ways we can address some serious societal issues and inequities that still exist in many parts of the U.S.

Another example is electric vehicles. We believe EVs can help bring the rural areas closer to urban centers, helping people travel longer distances at less expense for employment. Electric vehicles

that provide transportation equivalent to a dollar a gallon make that easier, especially in economically disadvantaged areas.

Our industry can do a lot to help address the urban/rural divide in many parts of this country. We also can help address socioeconomic issues – people who don't have mobility for jobs and healthcare. Electric vehicles have lower fuel and maintenance costs than traditional gas-powered vehicles and can provide lower cost transportation options.

Electrons have always been the same. But today, we can brand our electrons with the information associated with them, the products that we're providing, and the benefits for society. This is the golden age of the electric energy company.

If you want to achieve climate change goals or advance innovation that will save energy or improve lives, the quickest way is to have the electric energy company facilitate universal access.

Strategy&: How are you working to educate customers?

Nick Akins: As we are evaluating and rolling out new technologies, we first reach out to our own employees because they also are our customers, and they can help us test ideas. It is a way to determine if this subset of customers thinks this technology is valuable or not.

We're testing one concept with employees in Oklahoma right now. It's focused on information associated with the usage of appliances within the home and how that can help provide safety and peace of mind.

If you have elderly parents that live a thousand miles away and they typically turn on the coffee pot at 5:30 a.m. every day, you can use this technology to give you a status update if their routine changes and their coffee pot didn't get turned on at the typical time.

But, it's not just about security, it's also about optimization and efficiency, monitoring appliance usage that ultimately could be aggregated. We are testing those concepts with our employees and then we'll look at rolling them out more broadly to customers.

Education is going to be key. In a way, the electric system is like the health care system. You don't really know and understand what you're spending when you use our service.

I was in a coffee shop in New Albany, Ohio, and the young lady behind the counter asked me where I work. I said, I work at AEP, and she said, I hate AEP.

I asked why. She said, my bill was a hundred-eighty-six-dollars last month, and I could barely afford it. Well, the temperature

outside was ninety-five degrees. And, that was high, because it was early September.

I said, let's just talk about this a minute. What temperature do you keep your thermostat? She said, sixty-five degrees. I said, you're at work right now. Is anybody home? She said, no. I asked, what's your thermostat on? She replied, sixty-five degrees.

Due to the analytics available to us today, that can be made available to customers, there's opportunity for us to help educate customers like this woman in the coffee shop. We have an app that shows your usage in fifteen-minute intervals. It can be linked with another technology that allows you to see what each appliance is doing.

So, I pulled out my app. I showed it to her and told her it was available and free to her as one of our customers. At the end of the conversation, she was okay and feeling better about AEP because I showed her how to take control of her usage. I showed her that there are tools available that can help her define what her bill is going to be.

We need our regulators to understand that we can deploy technology to reduce the cost for customers or give them control to reduce their own costs. They need to be focused on the control our customers can have to adjust their bills, if we have the ability to deploy technologies that will support that.

It could be electric, transportation, and broadband on the bill. It's education for customers, but it's also education for the regulators. This world is expanding through electrification, and we've got to be ready for it.

Strategy&: Given that we're a technology push and customer pull environment; how do you get the employee base to embrace this concept of innovation?

Nick Akins: You've got to have a culture that embraces innovation. You also have to have a culture of openness, collaboration, and diversity that can question, test, and think about things from a different perspective.

For the last hundred and fourteen years, AEP has been primarily an engineering organization driven by engineers. Going forward, there is still going to be a lot of amazing engineering work that will be done, but there also has to be a focus on the arts associated with marketing, the ability to identify what customers expect, and how to communicate, connect and present ideas and products so that they resonate with customers. Clearly, that's an opportunity for us.

To help ensure that we are embracing innovation throughout the company, we've specifically spread our pilot projects and new technology tests throughout our organization. Each of our operating business units has responsibility for one or two pilots, and they're expected to compare notes so that we can all learn from their experiences.

That will drive not only ownership of the technologies and ideas, but also help foster innovation and the idea of doing new, different things throughout the organization.

PUF: How are you working to share the message outside of the company?

Nick Akins: It was incredibly important for us to participate in the smart cities activity in Columbus and be a major part of that initiative because it's an incubator for innovation.

We intend to take the ideas and lessons from the smart cities work being done in Columbus and start that same type of initiative in other cities where we do business.

We're also addressing policy impediments. We have legislation in Ohio right now that is addressing the inability of our AEP Ohio wires company to do things like consolidation of efficiencies for customers or aggregating customers, because those activities have traditionally been seen as generation resources and prohibited by deregulation in Ohio.

We hope regulators and lawmakers will understand the advantages for customers if the local electric provider can adopt and provide universal access to these new technologies.

There are parts of the legislation focused on allowing the wires companies to do bilateral contracts. Another part is focused on grid modernization technologies to enhance service for customers. In some states, legislation needs to evolve for customers to benefit going forward.

Strategy&: Comment about how partnering is providing an advantage to third parties.

Nick Akins: We have three ways we look at partnering with third parties. One is simply a business partnership. Another is participation in private equity funding where we have a place on an advisory board and have the opportunity to see the window of technologies developing. The final is direct investment. We've done all three.

We look at a technology and decide whether it makes sense for us to invest. In some instances, our investment can complicate the situation. For example, AEP having an ownership interest might alienate others who want to get involved. So, we carefully evaluate each opportunity.

There has to be a business reason for investing. Typically, we will not have a controlling interest. We'll be a passive investor. We also like to have the partnership arrangements and invest in funds because that gives us a broader net.

Strategy&: How do you think about the partnerships? Is it risk management and mitigation or is it capability strength?

Nick Akins: It's capability strengths, but risk management

is a big piece of it, particularly when you're dealing with startups. When you invest in startups you need to understand both their strategy and their financials.

It's a somewhat higher level of risk when you take that on, but if we're convinced a technology is very positive, then it winds up being an investment for us. They aren't all going to be winners. And, from a board perspective and an employee perspective, it's important that we make these types of investments with the understanding that some of them are not going to be successful.

It's also important to remember that you can still learn a lot from the ones that aren't successful. It has to be a no-regrets type of situation to be involved with technology development.

Strategy&: Elaborate on the capabilities that you want to start building muscle within.

Nick Akins: It's certainly marketing. We're also bolstering our economic development focus. And, data analysis is a huge priority. We continue to hire analytics experts, but it's incredibly competitive because everyone's trying to get that kind of talent.

We've also created our own innovation hub. It is focused on the through-put of new technologies to ensure that we're able to move quickly on not only the adoption, but the assimilation of new technologies into our business.

Strategy&: With respect to marketing, are there some capabilities like origination, product development, pricing, channel management?

Nick Akins: Absolutely. Our focus is on making sure we're able to market what we're doing to our customers. A lot of our current emphasis is on determining how we take our interactions with our customers – what they are telling us they want, need and expect – and use them to shape our conversations with regulators so that we have the regulatory structure and support that allows us to meet our customer's needs and desires, particularly related to new technologies and the adoption of those technologies.

We're also thinking about different tariffs, and the types of regulatory mechanisms that could be put in place to provide optionality and allow customers to use and benefit from new, advanced products and services. Enhancing our marketing and regulatory strategies is part of our technology pilot process. With multiple pilots in a lot of different states, we have the ability to evaluate the technologies, but also to determine how to best market them to our customers, and how we can work with regulators to get support for adoption.

Strategy&: How are you using the non-regulated opportunities in the business to grow harder and faster commercialization?



We need our regulators to understand that we can deploy technology to reduce the cost for customers or give them control to reduce their own costs.

Nick Akins: We call our non-regulated business our contracted business because we're focused on projects that involve contracts with customers. We don't do much spec work anymore.

We want our contracted business to be quasi-regulated, so that it produces a regulated level of earnings. Our technology and innovation focus is a shared service across the organization, and then we figure out which technologies or new business models are best for our regulated businesses and which are better for our contracted, or unregulated, businesses.

Our contracted businesses are putting together a variety of options for customers. Some customers want storage and solar. Others want battery technologies, fuel cells, etc. We want to be in a position to provide these types of technology options, but also to provide energy efficiency related technologies.

We're working with Walmart and several others on unique solutions to help them achieve their energy and climate goals. One example is a new natural gas facility that meets California emission standards. It's essentially a cylinder that fits in a tractor trailer rig that you can combine with solar. You can park it next to a store and meet the energy needs to operate that store. We're continually having discussions about those types of opportunities with customers and asking, where's the market and where are things headed? ○

Warner Baxter

CEO, Ameren

Strategy&: Bring us up to date on the last couple of years, your innovation efforts?

Warner Baxter: Big picture, a lot has been going on. And over the last couple of years, we've been productive from an innovation perspective. We've been innovating for one hundred years, so innovation isn't new to Ameren. But we've had a more intense focus on innovation over the last three, four years, and we're seeing progress in several respects.

Number one, culturally. We have made a step change in culture. Our co-workers are engaged and recognize that everyone is an innovator, not just a select few. They also recognize that our innovation efforts put our customers at the center. They are all about creating value for our customers and the communities we serve.

Then there's innovation from an operational perspective. This innovative mindset is helping us deliver safe, reliable, affordable and cleaner energy for our customers today and positioning us to do so for decades in the future. Our focus on innovation is also driving new products and services for our customers. On top of our already successful energy efficiency programs in Missouri and Illinois, we are getting set to roll out new renewable energy and electric vehicle charging programs in Missouri.

Also, we have gotten better at working with third parties. We recognize that we're not the font of all knowledge when it comes to innovation. We've been intentional in terms of how we're working with energy thought leaders, and we also have our own accelerator.

We've also done better on executing innovation. We are better in terms of identifying, prioritizing, and then implementing innovative products and services.

Of course, we are not done. While I am pleased, I can't be satisfied because our industry continues to transform. Our customers' expectations continue to get higher. Recognizing we are part of this country's critical infrastructure, we just can't sit on our hands. We have to be relentless in our innovation efforts because that's how we're going to enable and implement a brighter energy future, not just for our company, but for our customers and our communities. That's what innovation is all about. That's the "why" behind it.

Strategy&: Could you elaborate on some aspects of partnering.

Warner Baxter: From a partnering perspective, we have been working with the Electric Power Research Institute for decades, including on projects associated with the integrated energy grid

Innovative new products and services will help us get even closer to our customers.

and efficient electrification. Together, this work helps us ensure that we have good foundational research behind some of our key innovation initiatives.

The other thing we have done is start up our own energy accelerator. When we spoke two or three years ago, we were just embarking on this program. Now we're in our third year.

The accelerator is a unique public-private partnership among Ameren, the University of Missouri system, UMSL Accelerate, which is University of Missouri, Saint Louis' own Accelerator program, and Capital Innovators, which is one of the leading accelerator companies in the country.

This program is about identifying innovative products and services developed by entrepreneurs that we can implement for our customers. It also gives us the ability to bring students into the energy space and give them the opportunity to work with entrepreneurs and companies like us.

It's also given our co-workers an incredible opportunity to work with innovators. Our co-workers become mentors to these accelerator companies, and it is great in helping drive our innovative culture.

PUF: Could you paint a picture, is it a building, what does it look like?

Warner Baxter: Our accelerator is housed in St. Louis in one of the most innovative business districts in the country, called Cortex. While Cortex is a large innovation district, our accelerator operates out of a relatively small space that promotes innovation and agility.

The results from our accelerator program have been a very pleasant surprise. Year one, we had two hundred companies apply. Year two, three hundred. And we just finished our most recent one, with four hundred companies from over thirty countries around the world applying for this program.

We make an equity investment of about one hundred thousand dollars per applicant, and we usually do six or seven per year, so now we've invested in thirteen of them and we'll have another six or seven coming up at this next cohort.

I'm pleased to say that we've had successes. Some of these



We are investing in later stage start-up companies through Energy Impact Partners. It gives us another opportunity to keep our finger on the pulse and discuss innovative ideas with other utility investors in the fund.

companies are working with us on energy efficiency programs, on grid resiliency, and on cybersecurity. These are all early stage companies.

Our accelerator has been received very well in the company and in the community. What is even more exciting is that some of the start-ups are now opening their businesses in St. Louis.

To summarize, the objectives of the program are to keep our finger on the pulse of energy innovation. Also, to identify these technologies, to create this culture of innovation within our company, to ultimately implement some innovative technologies for our customers, and finally, to give students a unique learning opportunity.

We are also investing in later stage start-up companies through Energy Impact Partners. It is a fund that was established by industry leaders several years ago, and it invests in these innovative

our organization that has been around for one hundred years.

Strategy&: What would you point to that's helped you get the employees to embrace the notion that innovation is about continuous innovation, not just episodic?

Warner Baxter: It begins by having strong alignment among your leaders on why innovation is important and what your objectives are. In our case, delivering value to our customers is at the center of our innovation efforts, which we believe will also deliver superior value to our shareholders. As leaders, we have to be effective at explaining "the why" behind innovation.

Second, once you have that alignment you have to be clear in your messaging that it's safe to innovate. We've been in an industry where you don't get rewarded, necessarily, for innovating and failing.

What we have said is, when you're innovating not everything

energy companies. Investors in the fund include utilities from all over the world.

What's great about this partnership is we don't just invest and sit back and look for returns. Instead, we are working with Energy Impact Partners in identifying and evaluating these companies. It gives us another opportunity to keep our finger on the pulse and discuss innovative ideas with the other utility investors in the fund. Our ability to share common insights is valuable to help us continue to drive innovation.

Other third parties we work with are our local universities. We work closely with the University of Missouri with our Ameren Accelerator. We also work closely with the University of Illinois, collaborating with them. We have a technology center in Champaign, and we have an innovation center at the university where we have students and interns work on data analytics.

I call them "the kids." They're very effective at driving innovation. They're not afraid to come in and say why not, what if? This is a mindset we want to instill in



Warner Baxter, CEO, Ameren Corporation, meets with student interns participating in Ameren Accelerator, an innovative partnership with the University of Missouri System, UMSL Accelerate and Capital Innovators, that assesses, mentors, and invests in energy technology startup companies.

We have approval from the Missouri PSC to move forward with a 400-MW program where we can engage with commercial and industrial customers to assist them in procuring renewable energy.

is going to work. In those cases, we need to learn to move on quickly. Fail fast. When groups come in with innovative ideas and they fail fast, we recognize that. Because that's all part of the innovation journey.

We have also been clear in reminding our co-workers that innovation is not always a break-through discovery or incredible step change. It could be, but it need not be. A mindset of continuous, incremental innovation is transformational for organizations as well.

The bottom line is that innovation doesn't have to be a scary word. It's incremental change, and it's also step change. When you bring co-workers together, you give them that mindset and you have them start working together more effectively, then you start getting some real progress and continuous innovation.

Achieving a culture of continuous innovation is more than just messaging. We have to enable our co-workers to innovate by giving them tools. For example, we've created an online Idea Hub where co-workers can post their ideas. It's an internal social media kind of thing where they can start feeding off each other's ideas.

We also have an item called an IdeaHack. Annually, we invite co-workers from across the organization to form teams,

and for about two days, these teams create innovative energy solutions for customers, improve our operations or address other problems. It is a diverse group, many of whom have never worked together in the past. The ideas they come up with in such a short period of time are really incredible.

In the last three years, as we have become more intentional on innovation, we have seen our co-worker engagement scores shoot up. In part, it is also driven by more intentional messaging around our vision as a company, as well as our mission and purpose. Our mission is to power the quality of life. Our innovation efforts are directly tied to achieving our vision and mission.

When co-workers know that it's safe to innovate, that we want them to be forward thinking, and they are empowered to do so, then you get engagement. When you get strong engagement from your co-workers, then you're going to make real progress in terms of how we're serving our customers.

Strategy&: You mentioned new products and services. Can you expand on that?

Warner Baxter: Sure. A key area of focus in our innovation efforts relates to delivering new value-added products and services for our customers. In terms of new services, our digital investments are not only going to help us from an operational

standpoint, but they are also going to allow us to enhance our customer experience with improved services.

From a digital perspective, one of the services we are focused on is improving our communications with our customers during an outage. As you might expect, this is one of the most critical points in time that we have to engage effectively with our customers.

We are also focused on billing and payment, as well as move-in and move-out services. I know these services sound basic, and they are not new, but each of these areas are important interactions with customers. To the extent we can enable customers to perform these services at their fingertips, it will immediately enhance their experience with us.

In terms of new products, one product that we just rolled out within the last year is a Renewable Choice program. We did this in Missouri where we now have approval from the Missouri Public Service Commission to move forward with a four-hundred-megawatt program where we can engage with commercial and industrial customers to assist them in procuring renewable energy.

It will be a great opportunity to partner with them through a community renewable energy program that enables them to meet their sustainability goals. We can use our expertise in putting a good product together for them.

PUF: And the PSC was supportive?

Warner Baxter: Absolutely. They were also supportive of our Community Solar program. This program is much smaller in scale and it is for our residential customers. It is a one-megawatt program that was oversubscribed in two weeks, and our residential customers want more of it. We are installing the solar panels at Lambert International Airport in St. Louis.

Those are a couple examples of new products, new services. As we continue to move down the digital field, we're going to be able to offer greater products and services that will enhance our customers' experience in many different areas.

Looking ahead, I believe efficient electrification will be another area of focus for new products and services.

The bottom line is that our customers are starting to size up the quality of our products and services against what banks and airlines are doing, certainly from a digital perspective. While we don't have to be where these industries are at today in terms of the customer's digital experience, we need to be taking steps today to provide that seamless and distinctive customer experience in the future.

PUF: The efficient electrification is not just residential; it could be commercial and industrial as well.

Warner Baxter: Absolutely. I do believe that electrification is one that you're going to see a lot more attention paid to. Efficient electrification is beneficial for our customers, the environment, and the community. It's a win-win.

It will be critical to get the right policies in place to support efficient electrification for all of our customers. It will be time well spent.

Strategy&: Do you foresee that innovation will become a critical part in strategic growth in commercialization?

Warner Baxter: As we've seen innovation today, it's been more operational. In part because operationally you can implement these ideas more swiftly. When it comes to new products and services, they can take longer to implement due to regulatory review and approval processes. And that is fine. We understand it goes with the territory. The bottom line is that innovation will ultimately deliver significant benefits for our customers.

Down the road you'll see more commercial products that will come out as a result of innovation. I gave you just a few examples earlier, like the Renewable Choice and the Community Solar programs. These are products that our customers want, and we took steps to meet their needs. That's what matters.

Fail fast. When groups come in with innovative ideas and they fail fast, we recognize that. Because that's part of the innovation journey.

Innovative new products and services will help us get even closer to our customers. So far, we have given our customers greater ability to manage their bills and energy usage, we are communicating more effectively with them and we are giving them products to meet their changing energy needs and expectations. If we remain focused in meeting their energy needs and exceeding their expectations, especially if we can make their interactions with us simpler through innovation, we will all win.

Strategy&: What pleasant surprises have you had moving from three or four years ago to today?

Warner Baxter: When we decided to become more focused and intentional on our innovation efforts several years ago, I expected our co-workers would embrace these efforts over time. The pleasant surprise is how quickly our co-workers stepped up and became even more strongly engaged in our innovation initiatives. They have embraced this mantra of innovation for our customers. They also recognize that if we're serving our customers well, it benefits our communities and our company. They are all in.

There could have been a lot of resistance, but it didn't go that way. Let's be clear, we're not perfect. We have made mistakes along the way and we are still learning. One thing we have learned is the importance of change management around innovation. It has to be intentional and thoughtful. We recognized that you need to spend time explaining the "why" behind our innovation efforts.

I also congratulated our co-workers for the innovation that they had been doing for decades. This is not a new idea. We've been innovating for one hundred years and so I had to encourage them to continue to do what they've been doing. But I also had to remind them that our customers' expectations continue to get higher, and so too must our innovative efforts to exceed their expectations.

As I said, we are not perfect. In the past, we would not want to move forward until we were ninety-five percent certain that things were going to be perfect. But in our industry today, we have to start living in what I call a 70/30 world. Our industry is transforming and change comes more quickly. We have to be more agile; we have to check and adjust more than ever before. We have to be looking beyond the horizon, as opposed to looking backward. I'm fortunate to work with great leaders, great co-workers across the company who are willing to do that.

Strategy&: You've moved from engagements, through ideation, operationalization. What's the next focus for you?

Warner Baxter: We have several areas that we are focused on. One area of focus is moving more swiftly and effectively from ideation to implementation of these innovative ideas. We've established a strong foundation. As things continue to change, we have to be more agile and more thoughtful.

While we have a lot of great ideas, we need to do an even better job of prioritizing what ideas we will pursue. At our company, it is often hard for some to walk away from what seemed like a cool idea and focus instead on another idea that we believe will bring more value to our customers in a more timely fashion.

We as a company, and as an industry, have to continue to be more effective in our outreach to key stakeholders. Not just to regulators, not just to legislators, but to customers and key leaders in the community to let them know how our innovative

efforts are tied to delivering what I call a brighter energy future.

But also, we need to be more effective in communicating what our vision is. We as an industry, and Ameren as a company in this industry, are part of the critical infrastructure of this country. We have to be one of the leaders in this transformation to enable what is going to be a brighter energy future.

I strongly believe that we're going to have a more robust, resilient, and effective energy grid. One that's going to have a cleaner generation portfolio serving our customers. One that's going to give our customers greater levels of control over their energy usage and new, innovative products and services to serve them better. This is the vision of the future that I see over the horizon, and it is a brighter energy future for our customers and communities.

But it won't happen just because I say so. It will require us to continue delivering value through the billions of dollars of investments we make, and it will require us to continue to work effectively with our customers and key policymakers to ensure we have the right policies in place to support these investments and deliver this brighter energy future.

We have to be a leader, this critical enabler, and implementer. We talk a lot about leading today so that we can transform tomorrow, and I'm a big believer in that. We have to lead not just with messaging, but also by leading by making important investments in infrastructure, and by implementing products and services that are delivering real value to our customers and communities.

And at the end of the day, we must always remain focused on our mission, to power the quality of life, by delivering safe, reliable, affordable, and cleaner energy, and be willing to look beyond the horizon and say this vision of a brighter energy future is real. Come on the journey with us. ○

Leo Denault

CEO, Entergy Corporation

Strategy&: Bring us up to date on how the last couple of years have gone for your innovation efforts?

Leo Denault: Our innovation has become cultural, not just transactional or operational and our employees understand that we have been innovating for more than one hundred years.

Our company started with Harvey Couch signing a contract to burn sawdust to make electricity. We have come a long way from sawdust, through oil, coal, natural gas, and splitting the atom, so that the minute somebody touches a switch the lights come on. And that continuous innovation allows us to provide a critical service at a price point that is phenomenal.

Continuous innovation allows us to provide a critical service at a price point that is phenomenal.

We're in an industry where over 99.9 percent of the time everything works. It's been done so well that people just expect it. In our city and every other town in America, our employees are risking their lives every day to deliver electricity to our customers. Customer centricity is nothing new to our employees.

Our cultural evolution starts with our vision statement, we power life.

That's what we do. But customer expectations of how we power their lives are changing and growing more rapidly than ever. Technology, information, and data analytics give us better tools to meet those expectations.

Innovation now takes a different form because expectations are much higher. That forces us to think about outcomes not inputs. We want to think beyond the meter, and ask, OK, what outcomes do customers expect? The relationship does not end at the meter.

At the EEI financial conference a couple of years ago I asked the audience, how many of you woke up this morning and wanted to buy electricity?

Nobody wakes up and says, I'm going to buy some electricity. You want an experience enabled by that electricity.

It was dark, and you wanted to see, so you turned on the light. Innovation has to start with whatever experience the customer wants and work its way back to the tools, capabilities, culture, technologies, and data analytics we can use to help that outcome.

When we think that way, we start to find solutions that wouldn't have been found if all we were thinking about was the grid.

PUF: Is that leading to different outcomes in the last couple of years, this cultural thinking?

Leo Denault: A great example for us is in the phenomenal industrial growth along the Gulf Coast.

When these customers build something, it's one-, two-, three-, five-hundred megawatts worth of industrial power. One customer is going all the way to eight hundred and fifty by the time they finish.

If I sit down with them and ask, what is it that you desire? What are your outcomes? They always say, first that we want the electricity on, and we want it to be low cost. Obviously, that's a ticket to play.

Now, let's start to get into their business and ask, what am I helping the customer do?

Customers start out with things like avoiding disruption of a manufacturing facility because of a lightning strike or a flood. With a manufacturing facility, when they lose off-site power, things abruptly break or get severely disrupted. They have lost profit opportunity, raw material issues, and potential safety risks for their employees.



At the EEI financial conference a couple of years ago I asked the audience, how many of you woke up this morning and wanted to buy electricity?

They might have an image issue when the local community notices a problem with the plant.

The innovation could be as simple as asking the customer, what if I gave you more time? What if I notified you? Which of those bad outcomes wouldn't have happened because I gave you additional preparation time? Then they might respond, well, I could have shut down the plant myself in an orderly fashion. I wouldn't have a raw material issue. I wouldn't have a safety issue, and I wouldn't have a PR issue.

We're not yet at that technological state, but that is our goal and we're making progress on the cultural innovation where we're always thinking about the outcome the customer desires.

It can differ from customer to customer, but it may be that we can offer a whole set of solutions. We may need to enhance a substation so there isn't a power interruption, so we'll do that. That may take a lot of capital, time, and regulatory approvals. I can start preparing customers today, and then start to deploy

technology that solves those problems. That's where technological innovation meets cultural innovation.

Strategy&: What have you done to help employees embrace the concept of continuous innovation?

Leo Denault: Communicate, communicate, communicate. We started on a journey several years ago with my team to sit down and ask what does all this mean?

How are we going to take advantage of technology and data analytics?

That led to the development of an innovation hub where we train people in agile methodologies and processes. It's staffed with Entergy people who've been with us for many years, new hires with user interface and coding experience, and technology experts.

That part of the business has gone from zero employees three years ago and through several iterations to now approximately fifty people and growing.

We start with customer frictions and work toward a solution set and outcome they desire. Not necessarily just the input of electricity.

Our innovation group determines what kind of service, technology, information, and data analytics we could deploy. They use agile methods and our own multi-step innovation process.

Is it a business outcome for us one way or the other? Is there a reason we should be doing it and not somebody else? Is it really the ticket to play? And why us? We answer those questions up front instead of waiting until the end.

Our teams use agile methodology with concepts like a minimum viable product and take it to where it's been tested and evolved along the way.

An example: In the past, if we were solving the problem of people getting from point A to point B, we would have designed a car. We would have spent two years developing the car, and we'd give them a car.

In the new way, within six months we're giving them a skateboard. Then a bicycle. Then we're giving them a scooter to try. After that, maybe a car is the answer or maybe it's not. But the methodology helps us solve the problem first and foremost, and then use whatever technology is available to make it better.

The good news for us at Entergy and a few other companies who are fully integrated across generation, transmission, distribution, the meters, batteries, and solar, is that it doesn't matter what the answer is. We can deploy it.

That allows us to offer the lowest rates in the United States. On the other hand, if I was in a jurisdiction where all I could do was generation or wires, and a customer came to me with a problem, I would solve the problem the best way I could. If I was focused only on wires, the customer could say, I want a battery, and I'd say, I've got wires.

We've got a broader playbook just by virtue of the fact that we're still vertically integrated.

Strategy&: How do you take the next step from operationalizing some of the technologies to commercializing them?

Leo Denault: We need to continue to align our technological improvements with our regulatory constructs. We've become more efficient in having the benefits we desire to provide our customers covered in the regulatory world.

In Louisiana, in the regulation of generation plants we go through a competitive process to see who builds. We go through a certificate process to determine the need.

We've gone from ever-increasing efficiencies of gas-fired generation for years now. We just commissioned the St. Charles power station, nearly a thousand megawatts of the most efficient generation on our system. We have two more identical to it under construction; one in Louisiana, one in Texas, and two peaking units on a thousand megawatts of solar under development.

We've started a pilot, and we're going to see if we can scale it up in a regulated model. That is, go to low-income customers who own a home, and rent their roof with a bill credit.

The St. Charles project has forty percent fewer carbon emissions than what it replaced and is much lower in O&M than the units that it will replace. It's a much lower forced outage rate than the fifty-year-old units that it will replace. The customer gets the benefit that day as soon as it turns on. And the regulatory recovery is in sync, providing recovery at the same time as the benefits to customers show up.

In Arkansas, we've got a forward-looking, formula rate plan. We show what we're going to do during the year to benefit our customers. We put forth a forecast and effectively that's what sets rates for the beginning of the year.

At the end of the year we true it up and make sure that we did what we said we were going to do. It's efficient. Our regulatory constructs have evolved.

This year, we'll install a million automated meters. We'll have three million installed by the end of 2021. We've got a regulatory outcome in each jurisdiction that handles the existing meter and the new meter. The benefits show up to customers, and the financial flexibility of the company is maintained by the way it will enter into rates.

We're deploying technologies, data, analytics, and other tools to provide customers their desired outcomes under the watchful eye of our regulators. That's how we'll maintain a higher level of service to customers and consume a lower amount of resources.

We can continue to be competitive, to draw economic development into the Gulf South, help grow our business and the economy while making everybody better off.

Strategy&: Are you thinking about any non-regulated structures, about a broader portfolio or footprint they should apply some of these services to?

Leo Denault: Yes, but only if it naturally evolves. If it's focused on our customer and fits the regulatory model, we might do it.

If something doesn't fit that model, we will consider where that goes.

Our major focus is our three million customers in the regulated space who enjoy some of the lowest rates in America, with a growing economy along the Gulf Coast and a way for us to make their lives better on a regular basis.

For example, one of the issues you have in rooftop solar is it was only available to people with the right credit score. It's a big capital investment, or a big lease payment.

Since we provide universal access, we went through the process in our innovation center over a six-month period to get a solution from an idea onto the roof. We've started a pilot, and we're going to see if we can scale it up in a regulated model. That is, go to low-income customers who own a home, and rent their roof with a bill credit. That will allow us to put solar on their roofs and make the economics work out equivalent to net energy metering.

We own, operate, maintain, and install that for the customers. We'll go to New Orleans City Council and show whether the economics work well for rooftop solar. The beneficiary is the city, because it's part of a broader green energy future that the New Orleans City Council wants to achieve.

In the innovation center, they had mockups and asked, how do we make sure it works? What's it going to look like on somebody's house? They ask many questions like these.

But it's not only our innovation center employees who come up with ideas. If you're an Entergy employee in Mississippi and you have an idea of a customer friction you want to solve, you can fill out a simple form. You send it in. It gets ranked. The board of the innovation center evaluates it and says, that's one we're going to pursue. It gets worked on, and it gets kicked back out then to the operating company. We have potentially more than thirteen thousand whiz kids companywide.

Or maybe a regulator in Mississippi says, we want you to look at this kind of tariff, product or program. Our teams can bring that in and ask, what do customers think? If customers like it, then we have validation that it's a good idea.

Culturally, that's innovative. You cannot short-cut cultural evolution that asks, what do customers want, and how?

Strategy&: Fast forward to 2022. What would you like innovation in Entergy to look like?

Leo Denault: I'd like it to be just the way everybody operates, whether it's for internal or external purposes.

Our vision is that we power life. Our mission is to create sustainable value for our four stakeholders: our customers, employees, the communities we serve, and our shareholders.

Stakeholders all around the world want common outcomes. That's great for companies like Entergy.

Freedom is knowing that our largest institutional investors and the communities we serve want the same outcomes. They all have to succeed together. Our company culture should answer every investment decision with, how does this solution benefit our four stakeholders?

Years ago, when I first started talking about customer outcomes versus inputs, there was some semantic confusion. Some may have thought it was just that we'll keep the power flowing. No. Keeping the power flowing at the lowest possible cost is part of it. But providing customers with the outcomes they want is different.

We have started our own energy accelerator. It's about identifying innovative products and services developed by entrepreneurs that we can implement for our customers.

If you look at what customers desire, you will come up with more opportunities to delight them. More opportunities to allow them to achieve their wildest dreams while they consume fewer resources.

As we do that, then the economy grows, the community grows and the environment benefits. The shareholders are winning, and employees get an ever-increasing interesting amount of work.

For the first decades of my career our companies interacted with customers when their service was disrupted, plus twelve times a year when we sent them a bill. The only way we delighted them was after a storm when we showed up and put the lights back on. The rest of the time, we didn't interact.

We're entering a world where every fifteen minutes our customers will be able to know how much electricity they've used. Think of the difference between that experience versus historically when you got a bill and just knew it was a high bill and didn't know why.

Now, we're going to engage with customers to achieve the outcomes that they desire. We want to use technology to make their lives better. That's not just so we can inform them on all the myriad of things they can do to make their lives better, but because we want to work for them. I don't want to make them work for us. ○

Chris Crane

CEO, Exelon

Strategy&: Bring us up to speed on the last couple of years and how you've seen the innovation effort evolve.

Chris Crane: It's been an impressive galvanizing initiative, a cultural shift for the company, and it's not only about the technology. We've got great ideas coming up about simple things, high tech things, individual productivity, customer satisfaction, reliability, and resiliency.

When I started my career almost forty years ago, we were expected to check our brain at the gate and just do what we were told. Now we're enabling our employees with vehicles to bring ideas to the table and ensuring that their supervisors, managers, and executives are taking the time to understand what they're trying to do and support them.

Not every idea goes forward. But we just did our employee engagement survey. One of the questions was, do you feel like you can innovate in your job?

We're tracking that from 2017 to 2019 and continuing to do a lot of communication around it. It's been rewarding to watch the engagement. At our Innovation Expo, we had three thousand employees out of our thirty-four thousand that came to either show what they had done or look at what others are doing.

We started the real push when I heard about two meter readers in the Rockford region about five years ago. They were in their early twenties. It was the entry position, but they had developed an app on their own to help them do the job.

It used Google maps, notes, and the optimum route for meter readers to take. It had notes of, is there a dog? Where's the meter? It was just two individuals, so we asked, how are you doing that? And they made the app. So, then we got app developers and started to engage the employees.

It's been an impressive transformation if you think about companies like ours with roots back two hundred years, now telling employees, you need to think about your job differently and doing your job differently and concentrate on how we can satisfy the customers. Now it's about how we drive the reliability, and what's critical in electrification. It's been good.

Strategy&: How would you say that your efforts on innovation have changed the focus in terms of internal capabilities? What new skills and backgrounds are you trying to attract today?

Chris Crane: Five years ago, we didn't have a data scientist on the payroll. Now we've got dozens of data scientists on the payroll. With the advent of digitization, we're looking not only at meters, but at switchyards, our substations, and our nuclear

When I started my career almost 40 years ago, we were expected to check our brain at the gate and do what we were told. Now we're enabling our employees with vehicles to bring ideas to the table.

plants, incorporating AI or artificial intelligence programs into not only predictive maintenance applications like Predix at the nuclear plants and wind farms, but also looking at how we're doing evaluations on personnel.

We've adopted the IBM Watson program and we do not only a battery of tests, but there's an analytics personalities profile. Now we have a technology organization in our HR organization helping to support that.

We've seen a big shift away from our analog past into our digital future and what that requires for hiring and how we go about structuring our projects. It's been good and we're at a point that we are facing significant retirements as the workforce ages.

If you think about our nuclear plants that started up in the '80s, the start-up engineers became system engineers. They started running plants. They're all now at retirement age. In some of our plants now, over fifty percent of our engineers are just a couple of years out of college. Doing the knowledge transfers is important, but they bring a different mindset and capability to work. They're helping us save a significant amount of money, and drive reliability. It's the same on the grid side.

Strategy&: With the employee surveys, you have an assessing mechanism in place. Has that touched anything about how you had to realign your incentives to make sure that the message gets communicated and reinforced?

Chris Crane: We have done adjustments on incentives around the employee survey, but we have done more with ensuring accountability. We are able to analyze down to the supervisor what the engagement scores are for their employees.

How do employees feel that they're being treated as far as advancing and having a career opportunity? Do they plan on looking for a job in the next two years? We are down to that level of detail and down to the engagement scores on technology and

technology advancement. The tools have been useful.

It's more accountability than in the reward system. The reward system still focuses on customer satisfaction, cost management, and higher levels of reliability and we continue to tweak that. But, the way we're able to do that is through technology and an advancement of utilization and technology.

Strategy&: Has it changed other factors, like the access to the outside training or the way in which employees are paid for performance?

Chris Crane: Our training has driven us to do more outside leadership training, engaging in different programs to expose our people to broader thinking. We worry about becoming too insular the bigger we get, and we can't just benchmark ourselves. It's being able to utilize outside services for everything from diversity and inclusion to technical training.

We have an immersion program called, "White Men and Allies," and you go for three days. All executives will be going through it. It's a three-day program and it's a mix of white males, minorities, and women.

We started it three years ago. I plan to attend this year. It's enlightening. You don't think about unintended biases that you have. We're doing a lot of work on that to help attract and retain diverse individuals.

We've also started more small group meetings where I go out, and I met with every VP and most directors. We are continuing to explore diversity and inclusion and talk about unintended biases.

I learned about a first line supervisor at one of our utilities that had a young woman overhead electrician that wasn't performing up to standard, but he didn't give her any feedback about that. I asked, why didn't he give her any feedback? The answer was, I didn't want to be hard on her.



For years we've had a calibrations lab business that services our operations, but we offset our costs by doing a lot of other calibrations for outside companies.

You don't have to be hard on somebody, you just have to give feedback. But, for us to advance the workforce, we have to advance our awareness to attract the best and brightest in this competitive environment.

Strategy&: How are you making the shift to think more about commercialization on the technologies for your own financial purposes?

Chris Crane: We do that with different partnerships. We're a partner with GE on Predix as we develop the Predix application for our wind farms or for our nuclear plants, and we're in the process of developing the AI programs for our utility platform. As GE goes out and sells that, we get royalties.

PUF: So, you are a financial and strategic partner on that.

Chris Crane: We are. When you take a reel of wire out and you pull it and get down to a half reel, the next day you don't

know if it's enough, so you leave the half reel behind and get the new reel, so we're wasting cable.

A couple of the guys here partnered with a firm out of Canada that has a sensor on the reel that can tell how many times the reel spun. We're partnering with them and if anybody buys it in the power industry, we will get a royalty.

We have a CTV or Constellation Technology Ventures organization where we participate in higher series investments into innovative companies. With the Proterra Bus Company, we're one of the early investors.

That's the deregulated side of the business. We let the Proterra folks do the marketing.

We want to partner and develop technologies, but we don't want to pay for the development of the technologies solely for the benefit of the vendors. So, we partner with them and we've done it on a lot of different cases.

Our drone company provides extensive outside services. The drone company is out doing inspections for mostly co-ops and munis and for our pole inspections, with flyovers.

They have an optical device where they fly the wind turbine blades, so you don't have a person hanging off a turbine blade. It takes microscopic pictures. It can determine, through AI, where's the cracking, what's the issue, where's the location?

That kind of business helps offset our costs. For years we've had a calibrations lab business that services our operations, but we offset our costs by doing a lot of other calibrations for outside companies.

PUF: Constellation has these startup businesses too, such as the EV.

Chris Crane: The EZ-EV is one that we started pushing around. We have to stick to our core, which is serving our customers, but where we can offset our expenses, we're trying to advance that. The next phase that Anne Pramaggiore, CEO of Exelon Utilities, is working on is, how do we do those services behind the meter?

We already have a marketplace set up. If you go to the ComEd website and get on the marketplace, you can buy the NEST meters. We give rebates through energy efficiency programs. We're looking at trying to expand that to, can we get the services behind the meter and how do we develop the regulatory environment that supports that.

Strategy&: One of the things you have done is co-locate some resources in an innovation hub or center with other non-regulated types of entities. What are the early returns on that?

Chris Crane: We have two branch offices for the organization. One is in 1871, the principal innovation hub in Chicago. Brian Hoff, Exelon's VP of Innovation, has an office there and he comes back with a million ideas.

We meet once a quarter and it's like a mini shark tank meeting, only much politer, where the employees that Brian has helped sponsor come in and we take their ideas and see if we can bring

them to fruition. It's everything from the last mile support along our transmission systems to the EZ-EV, things like that.

We also have an individual helping in Silicon Valley. She worked for former Secretary of Energy Ernie Moniz. She's an MIT PhD. She's a brilliant woman, tied in with a lot of the startups that are looking at advancing new technologies, storage technologies, and energy efficiency technologies.

Strategy&: What makes these partnerships easier for you to address and make them successful?

Chris Crane: You have to be willing. That was one of the toughest aspects was to get our leadership to understand we can't do everything ourselves.

If we're putting in the Bronzeville microgrid, and said, we're going to own every component there, you're going to be in a fight. Are we going to own the charging stations for electric vehicles or are we going to partner with ChargePoint?

We were able to get regulatory approval to own storage and that's a big step. You have to be willing to partner.

Are we going to fight the Commission in the legislature so we can own the solar when ComEd's not supposed to own generation? No. We were able to get regulatory approval to own storage and that's a big step. You have to be willing to partner.

The devil's in the details on the agreements up front. We've had a couple of bad agreements and we've learned along the way. It's how you put them together.

PUF: Your Maryland Agreement on charging is tremendous.

Chris Crane: What we all learned from California is at first, they tried to exclude the utilities and now they're going back to include the utilities. It's getting that awareness, working with the stakeholders and also saying, look, we're the utility. A utility typically as a monopoly is looked at as not the most trustworthy.

If we're saying we should do something, it's a natural reaction to question us. The more you partner, not only with your regulators on developing the regulatory strategy but also partnering with other vendors, the more you include the environmental organizations.

You can have physical, financial partners or you can have issues partners. The only way we get anything done in Illinois is if you're sitting at the table with environmentalists and labor to be able to talk with one voice to the legislature. It's a transformation because that's not the utility model of the past.

Strategy&: How do you personalize the results of the innovation so you can focus at the customer level?

Chris Crane: We use a lot of communications. It takes more time. We have community meetings in Washington, Philadelphia,

and Maryland. It's the same in Chicago. We'll go to some of the churches and talk at the churches.

It's not only about what we're doing for them as a customer, but it's what we're doing for the community and what's our philanthropic focus, what's our volunteerism, what are we doing to help the underserved schools and the underserved individuals?

It's STEM programs. It's utility job awareness programs. That resonates in the focus groups and the community.

PUF: That nexus that is in D.C. It's very much that. They really worked.

Chris Crane: We came into D.C. thinking we're going to improve operations and we're going to make everybody's life better. We got kicked in our backside. It took three attempts to get the merger approved.

I'm thinking, am I that stupid? I'm going to try again. Luckily, the last time it got done. But what we've done since then is spend a lot of time in the community working with the naysayers and having dinner meetings and saying, let's talk.

The contributions that we're making in the community are not only financial, like building the bridge across the Anacostia River to link wards seven and eight to the rest of the District or paying for the metro to run at night after play-off games.

It has made a big impact. We're continuing to talk about reliability, advertising things like tax reform, and how much went back to consumers. We universally quickly had rate reductions filed in all our jurisdictions after tax reform. That resonated well.

We're at six hundred seventy-five million dollars on an annual basis going back to the consumers because of tax reform. So, it's more than just the technology for the customers, and reliability, what we're trying to do.

We're trying to put technology into the residential side, so only four hundred to five hundred homes would lose power if a tree came down. We've got reclosers, and fault detectors. One of the new engineers at ComEd has developed a device that starts to sense when a tree barely touches a wire, and it can give the exact location. You can put a tree trimmer out there right away before the tree gets too bad.

ComEd alone has improved its reliability in the last seven years by sixty percent with the technology and we're getting recognition for that.

Strategy&: Back to the stakeholder engagement. Do you see that engagement as the natural step in the process to be able to enable innovation to get deployed?

Chris Crane: I do. For driving electrification, do you think somebody can be out of power for eight hours at night while their car is supposed to be charging and get up the next morning, and go to work? We have to link the investment in the technology to the reliability, and customer satisfaction in the criticality of electricity in lives today.

They were happy from what I heard in Napa that they turned

the power off during a high fire risk period and that's because it was a bad situation. They didn't want to have wildfires. But that is a tough decision to make.

We're working as we make these investments to try to hold the rates flat or well under the rate of inflation. If we can save a dollar of operating expense, we can spend eight dollars of capital to do that and the rates stay flat. You can't spend for the sake of spending. You have to spend for the value to the customer and to drive efficiency.

Strategy&: Could you paint a picture for us of how you'd like to see Exelon position from an innovation perspective in 2022?

Chris Crane: There's a lot more that's on the drawing board right now. There are technologies that we can enable. There are a lot of requests to us from the different jurisdictions, more distributed energy, and how do we manage that distributed energy with newer technologies? There's one request to put six gigawatts of solar on rooftops in northern Illinois. I don't think there are enough rooftops to do that.

We're working as we make these investments to try to hold the rates flat or well under the rate of inflation.

Think about the shoulder months when the sun is shining, nobody is home and the overload of supply on the system. There's a lot that we're going to have to do to redesign the system using current and new technologies, new storage technology, flow batteries, and whatever it is to be able to enable that. There is no saying no.

You can explain to the stakeholders that's an expensive fix. You might want to talk about community solar, you might want to talk about large scale, but we have to maintain relevance. We have to support what our customers want and what our stakeholders want. I see the innovation continuing to head in that direction.

But also, we talk about system and operations innovation around the system. There's so much more that can be done with innovation around productivity. There's a group that has a hard hat that has a lens built in that you can move and you're getting a screen. A central expert or inspector can see the part a technician is working on in the field. You can do just-in-time training.

You can FaceTime with an engineer looking at something. It's where we're going with technology and what we can become as a company, more efficient, and effective.

Last time I was here I was telling you about an app that was developed where you can now take a picture of a damaged device out in the field. We're still working through the bugs, getting the GIS program up and running and continuing its development.

It knows exactly where that pole is. It knows the part identification code. You take the picture of it. You can start to build AI behind that and it automatically plans the work for our dispatchers.

That's continuing to advance. I see things like that coming up that will change the way we do business. But we're going to go through a major regulatory shift to be able to support this

and being able to start years in advance communicating what that shift should be.

Should we be on performance standards? Volumetric standards do not work for us because we're actually encouraging our customers to use less of our products, so you can't compensate us on volumetric. We've been able to slowly evolve the regulatory system to keep up with where we're going. ○

Tom Fanning

CEO, Southern Co.

Strategy&: Bring us up to date on the accomplishments over the last couple of years around innovation?

Tom Fanning: Innovation's been part of our DNA, in fact, we wrote a book that celebrated our fiftieth year of having research and development. The video was good too. The video won a regional Emmy and just fell short of a national Emmy.

I'm in my ninth year now as CEO of Southern and before I became CEO, R&D was focused on protecting coal. That was environmental controls and a variety of other things.

We've turned the focus of our R&D so that Southern as long as I've been here, has been essentially fuel agnostic. It's whatever makes sense and we believe in the full portfolio.

Moreover, I draw a picture, and it talks about how the age of big iron, which is where we still are, because technology's enabling it, because customers are requiring it, is starting to dissipate. That's not to say that the electricity business is dissipating.

For a variety of reasons, including electrifying transportation, you may see more growth than you have in the past. But what's filling the space between dissipating big iron, central station generation, big transmission lines, big hunky distribution, is the idea of what I call distributed infrastructure.

In 2015, we bought PowerSecure. If you think about a union set of three different companies in the Southern umbrella, it will fill the gap of distributed infrastructure. PowerSecure had been all over the map but focused on microgrids. At one point we had developed eighty-five percent of the microgrids in America, through PowerSecure

When we spun off way back in 2000, 2001, Southern Power was formed to do competitive wholesale generation. What's fascinating now is its last three wind deals have not been wholesale per se, but rather for commercial industrial customers, General Mills, General Motors, and Carnival Cruise Lines.

We look at this intersection of interests between commercial and industrial customers in the microgrid sense, and it's not just microgrids from dedicated wires, but distributed

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generation, proprietary switch gear, storage, and then the wire's a piece of that.

Then you add in the idea that we could do more dedicated, competitive generation out of Southern Power. We start now looking at a full offering of miniaturized big iron, which is distributed infrastructure.

The third element that has become important as we've been selling this concept to commercial and industrial customers is the company we call Sequent Energy Management. Sequent came from the acquisition of AGL Resources.

Sequent's job was to make sure that the pipes at AGL were filled up with gas. They took this fixed capability they do for AGL and then they said, you know what? We could do that for a variety of IPP entities around the United States.

Now we take this distributed infrastructure idea and add with that a service that does all the fuel management for this distributed infrastructure. Sequent joins the family and now you have this union of effort that is compelling.

R&D back in the old days, it's been kind of dedicated to a particular carbon-based fuel. Now we're doing R&D to think about the integration of what had been big iron, to miniaturized big iron, and now distributed infrastructure.

You can't keep the waves off the beach. This business intentionally cannibalizes our own big iron business. We're in the business now of creative destruction. While that feels threatening, my sense is the biggest risk we can do is to do



Energy Impact Partners has done exceedingly well and the leadership, the technology reach, it's been a good financial instrument, but it's giving us ideas and a reach to other technologies that will benefit us into the future.

nothing. Therefore, we're going to lean in, play offense, and hopefully invent the future that one day we'll displace our own big iron business.

That's the idea. It's drawn a lot of interest. It's had reasonable commercial success, it's profitable, made fifty million bucks last year.

For example, Shell sees big oil starting to be threatened to dissipate, and now Shell talks about getting into the power business. This is the kind of business they may want to get into.

We'll see how the evolution of different fuels, carbon-based fuels particularly, evolve over time and how this idea of how we're bringing technology and customer requirements together,

the business. There is a terrific transition now. What I love about these smart communities is solar by its nature does better at scale. Rooftop solar in and of itself is not an efficient answer, but if I can create community solar and get some scale, economics look a lot more compelling.

I have solar panels on my house, and I have Tesla power walls. Neither one is really that great. Because solar on your roof, your roof wasn't designed for solar. And the Tesla power walls, you're stuck in the current state of lithium ion technology. We know that storage must have material science changes. So, our R&D is working on that.

The other thing going in this picture of here's Power Secure,

change over time and we'll see where it goes. R&D now is focused on that integration. It's fascinating.

PUF: PowerSecure is supporting new development of sixty-two smart homes in Birmingham with one of the nation's biggest builders that is interested in building smart neighborhoods all over the country. Is that another growth path?

Tom Fanning: Sure. When you think about the customer base, there's wholesale, commercial, industrial, residential. The wholesales pieces are spoken for, for years. We were the biggest owner of solar. Then we've sold off a lot of those assets for tax reasons and now we're getting into wind, and we've done biomass.

That business is going to be there, but I swear to you, this evolution to distributed infrastructure by that business is what's important. That's going to occur first at the commercial and industrial sector. Fuel cells is another big thing we've been doing, but now the residential sector is spoken for with those kinds of approaches.

This idea of, energy to serve your world. That was our tag line. We did not say electricity to serve your world. I've always been a gas proponent. I thought that we had to be an energy provider, not an electricity provider. I am completely fuel agnostic. I'm going to provide whatever my customers need.

We think about how to organize the business. There is a terrific transition now. What I love about these smart communities is solar by its nature does better at scale. Rooftop solar in and of itself is not an efficient answer, but if I can create community solar and get some scale, economics look a lot more compelling.

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The other thing going in this picture of here's Power Secure,

here's Southern Power, here's Sequent. Now we're turning our R&D guns on these, trying to figure out how to better miniaturize big iron into distributed infrastructure.

We're also starting this with Energy Impact Partners. We were the founding participants of Energy Impact Partners. I was a little sketchy about that idea at first. There's so many venture capital, special equity ideas that you start, and they look great, and they stink from a financial standpoint.

Energy Impact Partners has done exceedingly well and the leadership, the technology reach that they have, it's been a good financial instrument on its own, but it's also giving us ideas through the transom and a reach to other technologies that will give us benefits way into the future. Now we're starting our second raise on that deal. It's been a good effort.

Strategy&: How do you get the employee base to embrace the concept of continuous innovation?

Tom Fanning: Culturally that is a tough issue. A lot of this transitioning away from big iron to a distributed infrastructure attacks your iconic one-hundred-year-old business model and along with that it puts jobs at risk. They have built their careers on big iron. The market will take it away, so we are better off to influence the market and get ahead of it.

I knew I had the CEO job at Southern about a year before I had it. We do a ton of psychological analysis. Southern has about one hundred and fifty officers. I'm sitting there and I'm talking to our corporate shrink and I said, give me the top thirty innovators, the revolutionaries, if you will.

And he came back with names and I said, there is no way that that guy is an innovator. There's no way that person is a revolutionary. What we have found over the years is adapted behavior.

If you think about a pie chart of Southern company, ninety-five percent of those people make, move, and sell energy. Five percent are the revolutionaries. These are the people that always ask, why and why not? And because we've been so good for so long, the people in the ninety-five percent want to assassinate the people in the five percent.

Turns out there's more people that do have an innovation gene, but they had subordinated it. They just hid it. There was a better slice to attack. Therefore, we started some things to celebrate the revolutionary in us all. And we did this SO Prize.

We allowed people to shoot at a vision in the future, in 2025, so, we were aiming ten years ahead. Then we said, if that's the future ten years ahead, give me some ideas that will allow us to wildly succeed relative to our competition, not just survive.

We came up with these ideas and we paid people big money. But the dynamics of how that intervened into the culture were interesting. We have thirty thousand people. About twenty-two thousand people in one way or another, participated in this effort.

The dynamic of that was interesting to reach across functional aisles and to start collaborating.

That's part of the innovation process. We created these ideas. We had almost a shark tank. We televised the pitches, everybody got to watch, and we made a big deal out of selecting them, and we committed money to every one of them.

What do we do beyond that? We've had several smaller efforts at innovation. We stood up our Southern Energy Innovation Center, which became a store front of what was occurring elsewhere. What has to be clear to people is that while there is some dedicated innovation that goes on at this Southern Energy Innovation Center, we reflect everything that's occurring in the organization.

It became interesting to see the interplay of risk and return and innovation into our business mix. I'm proud of that and we seek people out even in a board governance level. Once I had this job, in concert with the board, my first seat selection to join our board, was Dr. Steven Specker, CEO of EPRI. I got Ernest Moniz, former Secretary of Energy, now on the board. He's a thought leader in America, in how to transition our energy future.

Turns out there's more people that have an innovation gene, but they had subordinated it.

We started some things to celebrate the revolutionary in us all.

If you believe in this transition of big iron to something else, this capability, this skillset, this genetic makeup of revolutionary and innovation must be part of my successor candidate. It goes to how we're grooming people.

PUF: They're not there now, but where are they going to be in X years?

Tom Fanning: Part of their resume, as they rise through the company, must be a demonstration or at least an appreciation and a nurturing of revolutionary talent. That is a requirement. You have to keep intervening in the culture. What we do is we try to find people to do something different or they're squeaky wheels or they're persistent in their engagement of why not and raise them up in the organization. I try to visit with them personally.

We have an internal website named Tom.com where I talk to people and you'd be amazed at how active that is, people reach me directly and I answer everyone directly. I do not let anybody else answer them.

Strategy&: The SO Prize gave a lot of attention to the notion of how do we better our future and build a culture of innovation. Southern had a different angle with PowerSecure. How do you take the concept of pursuing commercialization beyond just PowerSecure into the rest of the business?

Tom Fanning: Let's differentiate between what we think about

R&D, dogmatically, and what we think about operationalization through PowerSecure. When you think about the classic S curve that is innovation. The base level stuff we don't do very much of. We do some bench research. A lot of that hadn't been in carbon capture. We still do some of that, some in storage.

We do that in collaboration with other people, but generally, we like dealing with universities or DOE labs as they get to do the base research. What we do as you start to accelerate the S curve is two things, every good R&D effort takes an idea that's out of the money and tries to make it in the money.

Our first step in trying to make an idea that is out of the money, in the money, is to try and break it. Every good idea, every innovation we try and destroy it. And when we do, when we aren't successful in breaking it, we create what we call a delta. Fix the delta, break it again, fix the delta, break it again, fix the delta and all of a sudden it starts to become resilient. Maybe it's prime time and then we put it into play, and we've done that in a variety of places. That's fun to do.

R&D is trying to get on the up slope and try and make it commercializable. The head of PowerSecure, at the Southern Committee Management Council level, also is the champion of the customer account size.

What we're trying to do is reverse engineer distributed infrastructure back in our business, with the theory that, we can take PowerSecure, brand it under Alabama, Georgia, or Mississippi Power. And either rate base it or take it outside the regulated purview, but have it branded in the local genre. And that's worked pretty well.

We put stretch goals on these people. I'll go to their customer council meetings and I'll say, hey, give me the next five ideas. If they don't have the right kind of stuff laid out that has a chance of making some money, we put a compensation goal and say, let me see it and we're gonna put you at risk. But reverse engineering is what we try to do.

What's fascinating is, the more susceptible you are to disruption, it generally means that either you have poor operations, you're not reliable, you have poor customer service, you're not liked, or it means you're too expensive.

That is the prime miasma that we want to attack, and we've been successful. Southern has this "horrible" problem of having great reliability, low prices, and the highest level of customer satisfaction in the United States.

The greatest harbinger of future failure is past success. They feel like they don't need to change. They're in a cocoon. What we have to do is put germs in the Petri dish ourselves. We have to inoculate to bring people because Southern's always been the model of having people that are there for their whole careers, rotate through, and mostly be Southern people.

Thirty years before I got this job, I was in fifteen different businesses, eight different business lines. Now what we're doing is

bringing in outsiders and being successful. Our CIO's an outsider, our chief counsel's an outsider. That's not normal.

Strategy&: One of the key takeaways for the SO Prize was more than half of the top twenty idea teams were populated by millennials. How do you sustain the momentum with that group?

Tom Fanning: It's continuing to innovate and to put real money behind these things. We have an annual meeting that feels like some cross between a Berkshire Hathaway meeting and Woodstock. We had something like two hundred and fifty people there. The Q&A session went on two and a half hours.

All friendly and respectable. No protest, no bad behavior. It is a great example of, number one, listening. My theory here, especially with millennials, people are more likely to raise their voice if they feel like they're not being heard.

The greatest harbinger of future failure is past success. They feel like they don't need to change. They're in a cocoon.

The point is reach into the pockets where the revolutionaries are. Listen, act, and celebrate. Make sure it is tangible for people. And we do this with our communications on Tom.com.


For example, if I would be leading this meeting, somebody would get their camera out and I'd say, here I am at the EEI Annual Convention and it's 2:30 in the afternoon and this is what we're talking about. I'm trying to create a much more organic connection with everybody in the company.

It's not a letter I send out. This idea of organically connecting to people is so important with these folks. They have to feel like they're being listened to and acted upon. It's not enough to give them a bunch of BS.

Strategy&: Paint the picture for how you'd like to see innovation working in Southern in 2022. What would be different about it than today?

Tom Fanning: It'll be easier because number one, this transition is happening, and it would be more tangible for people. So far, I've been waving my arms and drawing pictures and celebrating small successes.

My sense is, it's going to be a bigger deal in 2022. Second, we won't have questions about Plant Vogtle, that kind of sucks the oxygen out of almost every discussion. When you put that behind you, now it's what's next?

We'll be on this wonderful earnings trajectory once we get the Plant Vogtle expansion completed, but the what's next question, what are you going to do for me now? It will go to these issues. And it will be fascinating. 

and time-varying delivery charges will grow as customers, aggregators, and retail providers come to understand how they can use storage to benefit from these rates.

Regulatory commissions will also become increasingly aware that time-varying rates will be essential for supporting vehicles and building electrification at low cost. However, balancing time-varying delivery charges with fair cost recovery for utilities will likely require a shift to more complex rate structures.

Continuing a recent trend, future distribution utility rates will thus lie along a spectrum between a fixed, bundled average cost tariff and multi-part rates that enable greater customer price response. More price-responsive demand will lower long-run average costs, leading to bill savings for all customers.

But the value proposition of price responsive demand is in economic bypass, which implies some amount

of cost shifting among customers and customer classes. Regulators should not lose sight of the importance of rate design principles in navigating this transition in customer choice and cost allocation.

What Next?

The above discussion suggests that, within the universe of the utility of the future, there is a narrower subset of areas where focused efforts by regulators, distribution utilities, and stakeholders could enable significant progress in laying the groundwork for future distribution systems. The most important five of these include:

Rate design, focusing on new rate designs that accurately and fairly compensate customers for the flexibility that they provide to distribution systems;

Advanced distribution planning, focusing on developing the process coordination, data collection and management, analytical tools, and

cost-benefit frameworks needed to enable least-cost investments in future distribution systems;

Distribution open access tariffs, focusing on identifying an acceptable division of regulatory authority between federal and state regulators over wholesale transactions on the distribution system and developing pro forma content for tariffs;

Wholesale market designs for DSOs, focusing on developing DSOs and their capability for security-constrained economic dispatch, and on design changes in wholesale markets that enable more active intra-hour participation by DSOs while still maintaining adequate available capacity; and

DSO-ISO coordination, focusing on developing the market protocols, information systems, control and telemetry, and settlement systems for DSOs and ISOs to coordinate transactions at the distribution-transmission interface. **PUF**

CEOs Talk Innovation

(Cont. from p. 47)

partners. These utilities visualize hubs as formal catalysts for employee engagement and development of advanced technical thinking.

Innovation success doesn't depend on these "hubs", but they demonstrate commitment and a willingness to invest in tangible facilities that provide a home for continuous thinking and experimentation.

Digital Future

Digitalization is a core theme driving utilities, along with decarbonization and decentralization. These CEO are in some stage of planning, designing or implementing their digital future.

As data access expands across nodes,

sensors and monitors, exponentially more information is available than possible just five years ago.

The challenge is preparing utilities to be adaptive learners in a digital world. This means companies need to be adept in data science to expand capabilities in data analytics that enable greater data acuity. To shape their digital future, the CEOs are emphasizing technology pilots to provide real-time insight into how data access, configuration and application improve both operations and customer experience.

A New Agility

Utilities won't achieve their innovation objectives through stand-alone exploration.

The CEOs acknowledge they need partners to shorten learning curves, provide technology insights, and share risks.

The companies place a premium on knowing how to prioritize innovation endeavors and execute them rapidly. The CEOs are aware their companies need speed in execution, which requires breaking the mold for how innovation is pursued, and outcomes realized.

Agility is derived from both training and experience. The CEOs are investing in employee teaming so innovation can rapidly move from structured ideation to operationalization or commercialization.

The CEOs understand innovation maturity is far from realization with new frontiers to break through. They are invested in long-term innovation success and unafraid to push beyond organizational comfort levels to achieve results.

— Tom Flaherty, *Strategy&*