

Connected Communities: A Vision for the Future of Electric Utilities

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Abstract—On September 17, 2019, invite-only participants gathered at the Chicago Connectory to discuss the global energy transition as a part of TWIN Global. Participants included visionaries from inside and outside the energy sector, with representatives from industry leaders such as Exelon, Edison International, Dominion Energy, ConEdison, and Shell, as well as other pioneering companies across multiple sectors, premier academic institutions, think tanks, incubators, and investors driving change in the energy industry. Through a combination of keynote perspectives, panel discussions, and collaborative breakouts, the diverse group of participants discussed the exciting future of energy—the implications for climate change and distributed energy resources, the traditional utility business model, and the changing regulatory landscape.

Key words: Connected communities, energy market, global energy transition

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The following is the second in a series of Technology Managers Notebook articles on insights and implications for the future of the global energy transition from the session. This

article focuses on utility perspectives on the future of energy.

NEED FOR CHANGE

The fundamental challenge facing utilities is the increasing mismatch between mechanisms for customer value creation, and those for utility value capture. Historically, the most prominent value proposition for customers has been the provision of electricity as measured by the delivery of kilowatt hours. The utility has been well placed to provide this value through its transmission and distribution networks, and (as a monopoly) has earned a regulated rate of return proportional to the number of kilowatt hours delivered.

Prominent customer and technology trends have begun to establish large value pools closer to the end consumer of power and in some cases within the customer premises (behind the meter). These value pools have the potential to be larger than those represented by the delivery of kilowatt hours. At the same time, evolutions within the policy landscape

have made these same regions of the value chain less accessible to monopoly advantage, providing opportunities for new competitors from outside the utility industry to address the needs of utility customers. Successful utilities will define a strategic approach that accommodates these customer, technology, and policy changes.

DRIVERS FOR CHANGE

Technology Technology sets the future utility context in several ways. First and foremost, advances in energy efficiency, distributed solar, energy storage, and vehicle electrification impact electricity consumption to the extent they are adopted broadly within utility jurisdictions. These technologies are fantastic for utility customers providing more choice as it relates to electricity supply options, and at a potential cost savings over time. However, with the exception of vehicle electrification, these technologies reduce customer reliance on utilities for kilowatt hour delivery, thus challenging a utility business model dependent on kilowatt hour delivery. Secondly, many of these same technologies, especially when coordinated with one another, offer a potential replacement for utility infrastructure altogether in the form of *nonwires alternatives* (the combination of distributed energy resources, such as solar and storage, that substitutes the need for traditional utility equipment). However, despite these challenges, these and other technologies are the core enablers of the new value pools referenced earlier. New technologies provide new solutions for customer problems, and offer utilities an opportunity to leverage these technologies within new products and services. New products and services might include tools to support onsite power generation, power backup, or energy device maintenance in a way that is cost effective, ensures customer comfort, and safeguards their security.

Customer Technology advancement, both inside and outside the utility industry, will continue to prompt changes in customer expectations. The progression of technology toward smaller, faster, and cheaper provides the foundation for technology's omnipresence in our lives, while conditioning customers toward heightened expectations of choice, control, and convenience. For better *and* worse, utilities must expand their focus to accommodate the new customer needs that emerge from this reality, but these customer expectations impact current utility offerings as well. For instance, as technologies requiring electricity become increasingly pervasive, and customers ever more dependent on their capabilities for daily life, customer tolerance for power disruption approaches zero. Thus, in the future, a premium will be placed on the utility's role in ensuring *reliable, resilient, and secure* electric service.

Furthermore, as more attention is paid toward socio-economic disparity within the U.S. and beyond, the utility has a responsibility for ensuring equitable access to the utility products and services of the future. It must also find paths toward growth that do not include prohibitive customer bill increases, especially for low- and moderate-income customers. To be sure, these are challenging constraints for utilities, but these constraints underscore the value utilities provide in supporting the equitable provision of critical societal services.

Policy While customer and policy forces establish future value pools, policy provides a mechanism for distributing this value among the diversity of market stakeholders. The relevant host of stakeholders obviously includes customers and utilities, but increasingly includes new commercial entrants, such as Google, Amazon, and Tesla. While

utilities have historically been shielded from competition by their monopoly status, accessing the value pools of the future will require utilities define their value propositions relative to those of competitors.

Ironically, the same regulatory considerations that have ensured steady and reliable utility growth for decades have the potential to inhibit utility growth in the future. This is due in part to the fact that many of these mechanisms were not originally conceived to accommodate the technology and customer forces now intersecting within the utility industry. Additionally, while utilities are closely regulated, many of the aforementioned entrants defining the future competitive landscape are not constrained by the same regulatory structure, putting utilities at a significant disadvantage. There is, however, an opportunity for utilities to engage in a conversation with both regulators and new market entrants to identify new mutually beneficial business models wherein, for instance, market entrants leverage utility infrastructure to serve their customers, while fairly compensating the utility for that use.

THE WAY FORWARD

The forces previously described—technology, customer, and policy—offer both challenge and opportunity for the utility of the future. Crafting a strategy that optimizes for opportunity and minimizes risk requires first redefining the nature of “value” in the utility context. An organization's definition of value precedes the construction of a paradigm for coordinating that organization's resources for the creation of customer *value*, and the capture of shareholder (or stakeholder) *value*.

The kilowatt hour has served as a definition of value for utilities for

over a century. Utility operations, and the regulatory frameworks governing them, are organized around this premise. However, this is the old paradigm. Value in a new paradigm should be defined in relation to the *outcomes* utilities seek to produce for their customers. Value is created when customer problems are solved.

For example, Exelon has organized its strategy around four distinct outcome groups.

Reliability and Safety—Improving reliability for customers by creating a smarter grid that can “self-heal” and minimize disruptions.

Resiliency and Security—Ensuring resiliency and security against threats—cybersecurity attacks and extreme weather events.

Customer Choice and Distributed Energy Resources (DER) Acceleration—Enabling customers to

adopt DER (e.g., solar and storage) and ultimately transact as prosumers in an open marketplace.

Decarbonization/ Electrification—Achieving climate change objectives through electrification—transport, business, and residential.

These four sets of outcomes converge within a future we call *Connected Communities*. A Connected Community leverages the utility platform of infrastructure and services to serve the hierarchy of community needs. Providing these outcomes requires utility investment in targeted capabilities. In this case, we orient our investment strategy, not around the supply of kilowatt hours (a flat to declining prospect in most utility jurisdictions), but around the achievement of the aforementioned outcomes. In some cases, these outcomes will depend on existing utility capabilities, developed over the last century of

operation in our territories. In other cases, our utilities will need to mature new capabilities that fall outside the scope of traditional utility functions. In all cases, the path forward for our utilities runs through intentional engagement with the variety of stakeholders—customers, policy makers, community leaders, elected officials, interest groups, and industry partners—that have a vested interest in making the communities, we live in, clean, resilient, and equitable. This engagement serves to shape regulatory policy, and ensure its adaptation to the challenges and opportunities of tomorrow but is also about connecting to the constituents we serve and ensuring the solutions we develop accurately reflect the challenges they are facing. In the end, the utility’s greatest core competency is its connection—physical, social, and economic—to the communities it serves.

Phil Nevels received the bachelor’s degree in electrical engineering from Princeton University, Princeton, NJ, USA, and the MBA degree from the Booth School of Business, University of Chicago, Chicago, IL, USA. He is currently the Director of Innovation and Partnerships within Exelon Utilities (EU) Strategy. In this role, he is responsible for identifying, evaluating, and testing new technologies likely to impact the evolution of the utility business model. Evaluation of these technologies includes an assessment of feasibility, availability, economics, market potential, and customer receptivity. He coordinates the testing of these technologies in partnership with Exelon’s utilities and other external partners for the purpose of providing recommendations for technology investment and prioritization within Exelon’s strategic roadmaps. Prior to his role at Exelon, he was involved in several entrepreneurial ventures, including his role as COO/ Cofounder of Power2Switch (acquired in 2013 by Choose Energy), a company he started in 2009 to help residential and small commercial customers take advantage of energy deregulation across eight states.