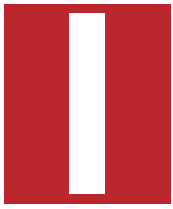


The Consumer- Centric Utility

Empowering Consumers while
Managing Risk and Optimizing Assets

BY JAN AHLEN



It's no secret. New and cheaper technologies are profoundly impacting the electric utility industry. The cost to install solar has decreased seventy-three percent since 2006. Battery storage costs are following a similar trajectory.

The proliferation of smart meters and Internet-connected devices creates an exponential amount of data on energy consumption. Consumers are also beginning to desire more control over their energy use. At the same time, consumers will continue to demand safe, affordable, and reliable electric service.

Paraphrasing Amory Lovins, they want their beer to be cold when they open their refrigerator. The combination of new technology and increased consumer expectations presents new and exciting opportunities for utilities and consumers alike.

Electric utilities do not simply sell a commodity. They sell safe, affordable, reliable and clean electric service. They sell the assurance that beer will stay cold twenty-four hours a day.

The "Consumer-Centric Utility" business model expands upon this critical service. The model provides a viable framework for utilities to continue to provide safe, affordable, reliable and clean electric service, while enabling new products and services that meet growing consumer expectations.

This article will define the concept of a consumer-centric utility, illustrate its advantages, and discuss the role of policymakers.

What is a Consumer-Centric Utility?

At its most basic, a consumer-centric utility is a utility that integrates and optimizes a pool of resources on behalf of its consumers. These resources can include traditional generation, transmission and distribution assets. They also include distributed energy resources, such as demand response, energy efficiency, energy storage, and distributed generation technologies.

What sets it apart from traditional utilities is that it empowers consumers by facilitating new service offerings. New services such as community solar programs are tailored to local conditions and specific consumer preferences. It also manages risk and provides energy advice to consumers.

To put it simply, the core business structure of the utility remains constant. But the business that consumer-centric utilities operate in will continue to evolve.

The general goals of all consumer-centric utilities are the same. But the model is flexible to accommodate different consumer preferences and geographic areas. What may work in the borough of Manhattan, in New York, may not be appropriate for Chapel Hill, North Carolina. The model is fundamentally flexible so that it can advance in line with consumer desires.

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A consumer-centric utility integrates and optimizes a pool of resources on behalf of its consumers.

regulators give them the correct incentives, or if management has the inclination.

Empowering Consumers and Enabling Distributed Energy Resources

The consumer-centric utility is well-positioned to deliver innovative solutions. This is because it is consumer-focused, takes a long-term view, and has economies of scale, scope and integration.

A long-term view is important because certain grid investments are necessary to enable new solutions well into the future. An investment in a two-way metering system, for instance, may be necessary to enable consumers to control their energy usage and facilitate new services in the future.

Scope and integration allow a consumer-centric utility to take a broad perspective of the system. A holistic view is necessary to understand how all of the pieces fit together.

Various system benefits may not be realized if certain investments are not made in a different part of the system. For instance, the utility could see the benefit of making investments

It is important to note that consumer-centric utilities can be investor-owned utilities, municipal utilities, or electric cooperatives.

Electric cooperatives and municipal utilities are naturally consumer-focused because they are locally or consumer-owned. Investor-owned utilities can also be consumer-centric if state

in sensor technology in places with a high penetration of distributed solar.

Economies of scale can bring to bear necessary resources to invest in appropriate grid technology and enable cost-effective behind-the-meter solutions. This does not mean that the consumer-centric utility can do all of this itself.

On the contrary, partnerships with diverse third-party providers of distributed energy resources will be crucial. What the consumer-centric utility does, however, is leverage these partnerships in a way that optimizes the system and improves energy service for its consumers.

An increased consumer focus is what separates consumer-centric utilities from traditional utilities. As consumers demand new products and services, this flexible utility would enable those services in a way that meets individual needs and works for the system as a whole.

Know Your Consumer

Grid technologies such as advanced metering infrastructure systems, smart inverters, and sensors provide consumer-centric utilities with a wealth of information about their consumers and the system. With these data, they can also improve system performance, thanks to advanced analytics capabilities.

Consumer-centric utilities actively engage their consumers through surveys, polling, and other methods.

One example is CoServ Electric, which wanted to reduce electricity use during peak summer hours.

The consumer interest generated by a small demand response pilot program in 2015 prompted the co-op to expand efforts. In 2016, the co-op partnered with Nest and its voluntary demand response program called Rush Hour Rewards.

CoServ provides a one hundred dollar credit if a consumer enrolls a Nest Learning Thermostat in the program. After the first year, participants receive a forty dollar bill credit each year. The target goal of three thousand thermostats enrolled in a year was reached in four weeks.

Creating an Ecosystem for Distributed Energy Resources

A critical piece to enabling distributed energy resources is an optimized ecosystem. This ecosystem includes generation, transmission, distribution, and distributed energy resources. New technology integration must promote safe, affordable, reliable, and clean electric service.

The electricity sector is complex. Each segment of the grid is affected by every other.

It will become even more complex as new technologies, and two-way flows of energy and communication, continue to proliferate. Interoperability protocols, sensors, smart inverters and other grid modernization investments are tools that consumer-centric

utilities have in creating an optimized ecosystem.

A consumer-centric utility is well-suited to plan out a technology ecosystem. This is because the utility takes a long-term view and sees the system holistically.

The Electric Power Research Institute also argues that a planned distribution grid will be more efficient and cost effective than an unplanned grid.¹ Utilities will design ecosystems that reflect unique, local conditions, implemented at the rate of value to the system as a whole.

Vermont Electric Cooperative provides a useful example of a utility that planned out strategic grid investments tailored to local conditions in order to enable new services behind the meter.

Vermont Electric is the largest locally-owned electric distribution utility in the state, serving seventy-five towns and territories in rugged and remote areas. Between 2000 and 2014, the utility took a step-by-step approach to creating its technology ecosystem.

An essential component was its electronic mapping system. This integrated into its operation technology and information technology platforms in 2001.

The next step was the selection of an automated two-way meter platform that could fit with the rugged service territory. Once that was in place, Vermont Electric installed and integrated an outage management system with the meter system. Thanks to this integration, the utility was able to cut its number of outages in half.

The final step was upgrading its supervisory control and data acquisition system to enable integration with the advanced metering infrastructure system. With these investments, Vermont Electric is well-positioned to provide new services to its consumers and adapt their system to increasing amounts of solar and other distributed energy resources.

The partnership between North Carolina Electric Membership Corporation, a generation and transmission cooperative, and its member distribution cooperatives, provides another example of how a consumer focus yields innovation.

The cooperative has always supplied power and related services to its member distribution cooperatives. But now the generation and transmission utility cooperative and local co-ops see opportunities to link wholesale and retail power in a distribution system operator environment.

In this environment, the distribution co-op remains responsible for balancing supply and demand, as well as maintaining its distribution system and interfacing with members. The

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electric membership corporation's role is to pilot technologies like Internet-connected ecobee3 thermostats. It will also manage some integration of distributed resources including community solar projects and energy storage.

The generation and transmission cooperative is also working with its member cooperatives to find upstream value from transmission providers and energy markets through services like conservation voltage reduction. Each of these initiatives is consumer-focused, with wholesale impacts. The new ecosystem is primed for continued consumer-first innovation, like the current build out of two reliability and sustainability-focused microgrids in co-op communities.

The distribution system operator structure benefits the member cooperatives by providing competitive resources and greater predictability. The structure also maintains affordability, reliability, and member relationships.

In the case of both Vermont Electric and North Carolina Electric Membership Corporation, the existing utility effectively planned out a series of investments that fit with its specific service territory and consumer base.

and financing and insurance options. These tools will help to drastically reduce soft costs.

Okanagan County Electric Cooperative, located in eastern Washington, currently has two community solar systems. It launched the first system in 2010 due to consumer demand. It then quickly expanded to two systems because shares quickly sold out. Okanagan County Electric was effectively able to gauge consumer interest in solar and provide an innovative, cost-effective solution.

“Community solar allows any consumer who wishes to own solar the ability to do so.”

– Jan Ahlen



Community Solutions

Understanding the consumer and taking advantage of economies of scale, scope and integration can be a powerful combination.

In recent years, solar development has skyrocketed. While a lot of attention is paid to rooftop solar, only a fraction of U.S. households have suitable rooftops.² Many other interested consumers may be renters. Community solar is an attractive alternative. It allows any consumer who wishes to own solar the ability to do so. It is also cheaper than rooftop solar.

The utility can take advantage of economies of scale and site the project in a location that is optimal for the system. Under community solar programs, the utility would develop a solar farm itself or work with a third-party developer.

It would then allow interested consumers the ability to buy a panel, or a share of the system. So instead of owning a solar system on their rooftops, consumers would own a piece of a larger solar system.

Electric cooperatives are leaders in community solar. They're working together to lower community solar costs and deploy systems more easily.

The National Rural Electric Cooperative Association, the trade association representing America's electric cooperatives, leads a U.S. Department of Energy SUNSHOT-funded project. The project is called Solar Utility Network Deployment Acceleration.

The goal of the effort is to develop a photovoltaic system package consisting of engineering designs, business models,

The Colorado Energy Office and GRID Alternatives has taken the community solar idea a step further. The groups partnered with five electric cooperatives in Colorado. They created community solar systems designed for low-income households. By providing the cooperatives with these community solar models, the two organizations are helping to ensure that all types of consumers are receiving affordable energy while utilizing new technologies.

Behind the Meter Market

When talking about her cooperative, Christine Hallquist, chief executive officer of Vermont Electric Cooperative, says that “our responsibility is to the meter. Our opportunity is beyond the meter.” Vermont Electric's consumers already receive behind-the-meter solutions thanks to the distributed resource-enabling ecosystem.

In 2014, Vermont Electric decided to provide the mobile platform SmartHub to its consumers. SmartHub is an account management tool that enables consumers to manage all aspects of their utility account.

In addition to paying their bill, consumer-members can view their power usage data, report an outage, and set up alerts to be notified when a power outage occurs and when power has been restored. Hallquist says that these types of services will expand in line with consumer demand.

Since the launch of the Tesla Powerwall, there has been

increased excitement about in-home battery systems. Green Mountain Power, a Vermont investor-owned utility, was well in tune with its customers' desires. As a result, Green Mountain began offering various financing options to its customer base to install the battery system.

Consumers behind the meter are becoming increasingly important in helping to integrate renewable energy and to manage the grid, by using energy wisely to coincide with energy supply availability. The idea of community storage³ is an emerging approach that enables utilities and consumers to share the benefits of the energy storage available in hot water heaters, electric vehicles, or home battery storage systems.

Great River Energy, a generation and transmission cooperative in Minnesota, coordinates the use of the overall storage capability in electric water heaters. There is nearly a gigawatt-hour worth of storage in hot water heaters in the service territories of Great River Energy's twenty-eight distribution cooperatives.

Great River Energy integrates the common home appliance with wind and solar power. By funneling latent energy generated by these sources to water heaters, and then using advanced controlling systems, participating customers are able to save up to two hundred dollars annually. The co-op is also able to manage energy load demands across their entire community more efficiently.

Steele-Waseca Cooperative Electric, participates in Great River Energy's water heater program, providing interested consumers with a free one hundred and five gallon grid-connected electric water heater. The program allows Steele-Waseca to control twenty percent of peak load, passing on those savings to the consumer.

Recently, Steele-Waseca's members began expressing interest in solar energy. However, a rural co-op with fewer than ten thousand members would inevitably face monetary challenges when trying to finance a solar program. So, the utility decided to pair its existing hot water heater program with a community solar program.

Steele-Waseca offered members who opt into the successful demand response program the opportunity to purchase a four hundred and ten watt solar panel for one hundred-seventy dollars. This amount was ninety percent less than the panel would ordinarily cost. The financial math worked out.

Steele-Waseca was able to save money by shifting load. And

it gained extra revenue from the additional electricity sales from the water heaters.

Consumers are able to purchase solar energy from the community solar system and save money. This provides a perfect example of the advantages of scope, integration, and consumer focus.

How to Enable the Consumer-Centric Utility

Policymakers do not need to radically alter regulation or retail markets to promote innovation and distributed resource solutions.

The future is bright if utilities become more consumer-centric.

Their consumers while achieving traditional goals of safe, reliable, affordable, and clean energy.

One-size-fits-all policies get in the way of delivering appropriate solutions for individual areas. Given the diversity in service territories and consumer preferences across the nation, flexibility should be afforded. In other words, policy makers should not promote specific policies or technologies by picking winners and losers.

Conclusions

"Consumer-Centric Utilities" represent an evolution, not a revolution, of the role of the electric utility. Utilities continue to evolve at different rates. But they all focus on the consumer in order to provide new service offerings, and safe, affordable, reliable, and clean electric service.

One thing is clear. The future is bright if utilities become more consumer-centric and policymakers give them the flexibility to implement local solutions. **PUF**

Endnotes:

1. Electric Power Research Institute, *The Integrated Grid: A Benefit-Cost Framework*, Final Report, February 2015.
2. National Renewable Energy Laboratory, *Estimating Rooftop Suitability for PV: A Review of Methods, Patents, and Validation Techniques*, December 2013.
3. Keith Dennis, "Community Storage: Coming to a Home Near You," *Public Utilities Fortnightly*, February 2016.

The key for policymakers is to support consumer-centric utilities to make decisions tailor-made to local circumstances. This will organically lead to a future where utilities provide a wide variety of energy services options for