The 2017 State of Energy Efficiency

Innovation Outlook

CLEAResult®

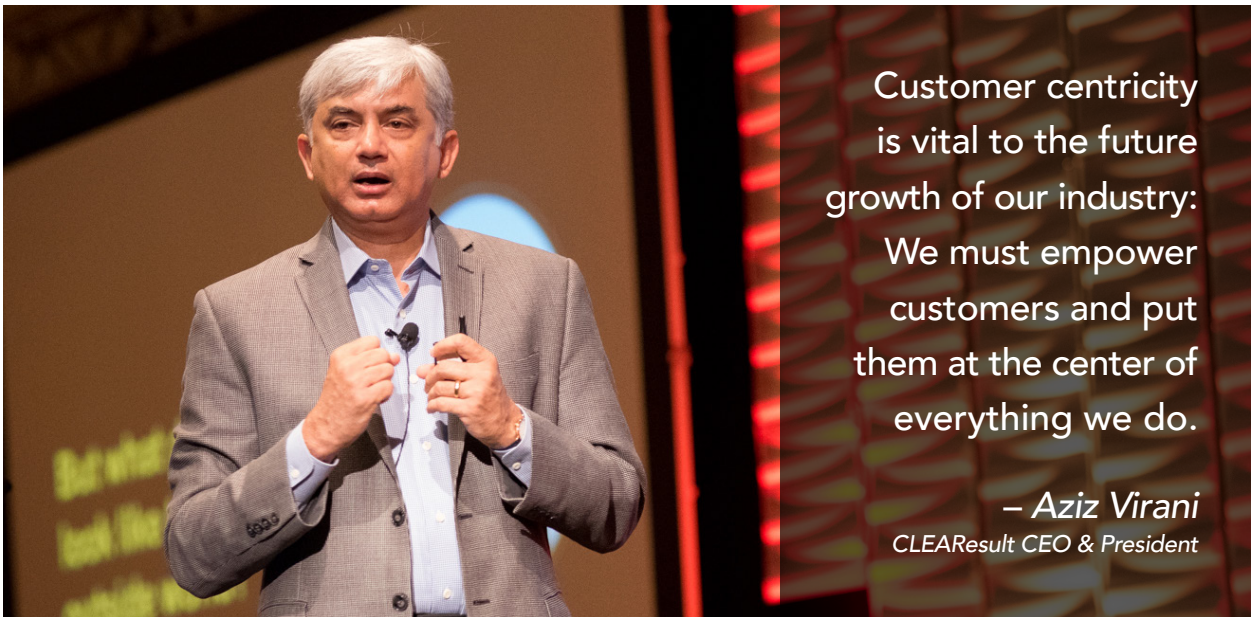
Executive Summary

Modern life is energy-intensive, and it's easy to consume resources without thinking. But news about alternative energy, smart homes and energy efficient products and technologies has heightened consumers' awareness about their energy footprints and behaviors. There's a spotlight on energy efficiency that is changing everything from policy to how businesses and people manage their consumption.

As utilities shift how they do business, they must adapt to new challenges and take advantage of new opportunities. Customers are more discerning about energy efficiency, new competitors have entered the broadening energy space, load growth forecasts are down and regulatory oversight is unrelenting. This is all leading to necessary transformations in utility industry business models.

Energy customer proactivity is a catalyst for change and innovation across the utility sector. Consumers are more engaged with energy efficiency, and the concept has moved beyond regulatory insiders, to a broader societal discussion. While this is accelerating change across the energy industry, it is also creating massive opportunity.

"Customer centricity is vital to the future growth of our industry," said CLEAResult CEO Aziz Virani. "We must empower customers and put them at the center of everything we do. If we do this well, the customer base will make better, smarter energy choices that benefit our industry and society as a whole."



Increasing customer expectations are not the only challenge utilities face. New technologies and a focus on consumerism are attracting new entrants into the market, including formidable players such as Google. This creates intense competition for high-quality talent. Traditional utility companies will increasingly compete for both market share and talent against a new breed of energy player, from tech companies to solar developers to storage providers.

Distributed generation is yet another obstacle. New competitors offering greener alternatives are forcing the utility industry to consider alternative energy sources and storage solutions to sustain growth. This creates short-term challenges for utilities, but it will also provide an impetus to add new revenue streams from yet-to-come energy resources.

We cannot forget the ongoing influence of industry regulations. State-to-state variability and unpredictable national policymaking are challenges, and we're still not seeing a meaningful shift toward standardization. But utility companies that develop strategic plans for hitting performance incentives can tap this as a viable source of revenue in the future.

Better customer engagement, a broadening market, targeted incentives and ongoing innovation have led to significant changes in the industry. And we're just seeing the beginning of what's possible with energy efficiency. Amid these changes, the industry mustn't choose denial as a convenient path forward—doing this could mean that many organizations are left behind.

David Rowan of WIRED UK magazine cited a 2007 television appearance by then-Microsoft CEO Steve Ballmer.

Ballmer said he didn't see the $500 iPhone as a threat, and, in fact, made fun of its lack of a keyboard which, he asserted, would make typing emails difficult, rendering the phone unsuitable for business use.

Rowan pointed out the parallels with the coming wave of innovation in the energy market, saying, "It all comes down to how you respond."

This is the start of an important journey, and work remains for the energy industry to embrace change, adopt new business models and engage with today's commercial and residential customers who will help to lead this transformation. The fastest path forward is likely to be one where the utilities and their customers share common goals and where there is ample opportunity for all parties to benefit.

Innovation Outlook:
The 2017 State of Energy Efficiency

Customer Empowerment

01

Increasing customer satisfaction
Personalizing the experience
Motivating customers with incentives
Commercial customers' experience
Optimizing customer outreach
The future of customer service

Overview

Improving customer satisfaction is an increasingly important goal for energy providers. This is evident in the many new and innovative ways providers are engaging customers to meet their changing expectations and demands.

Successful energy efficiency programs can dramatically increase customer satisfaction. This often involves finding the right balance of customer incentives to align with the programs. Unfortunately, constant changes in regulations can affect that balance, leaving trade allies and customers uncertain about the path forward. This uncertainty can stall innovation and sap resolve.

> How we use technology and data analytics informs how we engage with a variety of commercial customers who have very different needs, requiring distinct strategies and unique value propositions from us. Unless we understood that, we'd never be successful in engaging them in our programs.
>
> *– Tilak Subrahmanian, Eversource*

Behind every successful energy efficiency program is a sponsoring utility that is fully committed and engaged. Successful utilities heavily rely on customer data and analytics to identify ideal candidates for energy efficiency programs. Today's more sophisticated data management tools are replacing older, less reliable methods such as participant tracking spreadsheets. This is a trend that is likely to accelerate.

Although customer satisfaction has increased as a result of successful programs, the industry must remain committed to continuous improvement as energy consumers become savvier and expectations increase. The bar continues to rise, the industry must offer innovative approaches that achieve greater efficiency without creating inequity. We should see a much more dynamic industry in the coming years.

Increasing customer satisfaction

Today, customers expect personalized approaches tailored to their specific needs, and this includes communications. According to Carl Lepper, senior industry analyst, utility and infrastructure practice at J.D. Power, "Effective communication is everything when it comes to utility customer satisfaction.[1]"

Communications must be both proactive and two-way. Customers must be able to express their needs and concerns with full confidence that their energy providers hear them and are able to transform insights into meaningful operational change.

A critical path to increased customer satisfaction is CLEAResult's People First, Buildings Second™ approach. This entails:

- Gaining a well-rounded understanding of the customer's needs, wants and pain points;
- Using technology to personalize the customer experience;
- Providing customers with a path to participation;
- Becoming the customer's trusted energy advisor;
- Tuning into customer attitudes and behavior;
- And amplifying the voice of the customer with their utility provider.

As David Rowan, editor of WIRED UK, pointed out, collaborating with energy advisors who have been trained in building sciences, behavioral sciences, sales and customer service and can work with customers on rebates, financing energy efficiency, green power and demand response is a smart strategy, and utilities that do so will lead the industry in customer satisfaction.

[1] J.D. Power, Gas Utility Satisfaction Reaches All-Time High as Business Customers Note Communication Im-provements, J.D. Power Finds http://www.jdpower.com/press-releases/2016-calendar-year-gas-utility-business-customer-satisfaction-study (Feb 8, 2017)

Personalizing the experience

Customer experiences are changing as the industry embraces new tools and technologies, from interactive platforms to game-like experiences. Innovative apps can drive new reward systems, encouraging more desirable energy conservation behaviors among consumers.

New tools and technologies are having a dramatic impact on satisfaction levels and, more important, behavior. Rewards systems encourage better habits, but do so by putting the consumer in charge instead of penalizing them.

Anecdotal evidence from across this industry shows that when consumers receive a personalized note in their bill related to energy efficiency and how they compare to their peers, engagement is significantly higher. According to Robert Cialdini, a social psychologist at Arizona State University, who studies how to get Americans to lower energy consumption, few methods are as effective as comparing people with their peers.[2]

Motivating customers with incentives

Incentives, which vary greatly nationally, are critical to making energy efficiency programs attractive. But getting these incentives right for both residential and commercial and industrial customers can be a challenge.

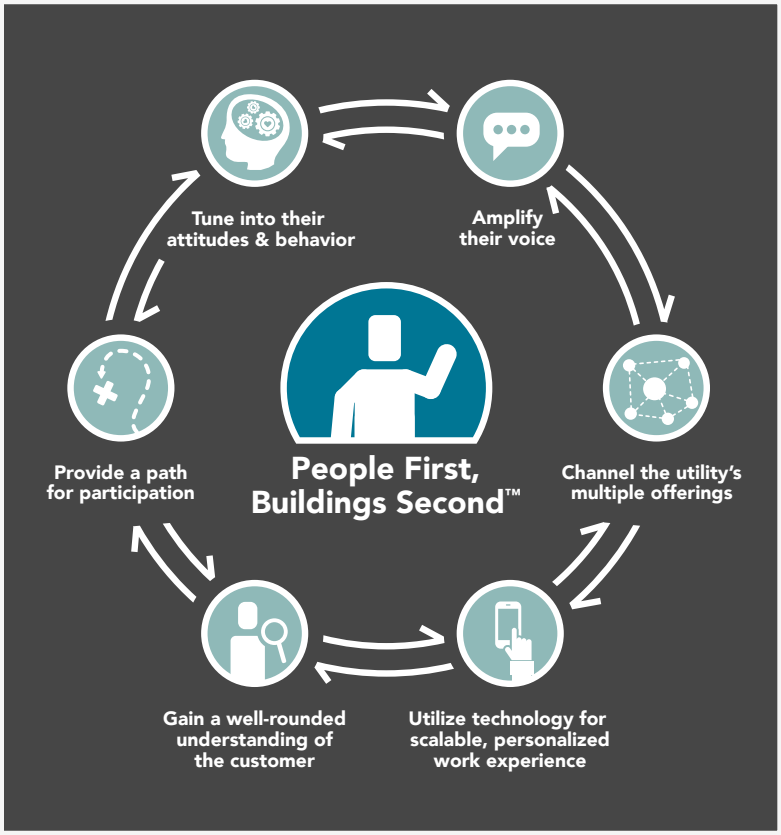
The size of the incentives required to promote energy efficiency varies with local electric rates. In New England, for example, where rates are approaching $0.16 per kilowatt-hour, motivating energy efficient behavior is easier than in regions with lower-cost power. But determining the optimal incentive for a given area is not alway so easy.

Utility regulators tend to support energy efficiency programs that provide significant benefit to customers. For utilities offering excessive rebates and incentives, however, this can lead to overwhelming demand and, therefore, a temporary degradation of the customer experience when a program becomes oversubscribed. It makes sense to develop unique program rules and propose a mutually beneficial program design to local regulators. This approach can help eliminate confusion and improve overall customer satisfaction.

[2] The New York Times, Utilities Turn Their Customers Green, With Envy, http://www.nytimes.com/2009/01/31/science/earth/31compete.html (Jan, 30 2009)

Motivating customers with incentives — Continued

Customer experience (CX) is the sum of experiences a customer has with your organization, over the duration of the relationship. Success starts and ends with CX: happier customers make happier regulators; happier customers buy more products and services; happier customers cost less to keep. It is a virtuous cycle: satisfied customers lead to positive regulatory outcomes that support investments that satisfy customers.



When working with regulators, utilities must commit to strong, open and proactive communications. When a new rule is established or an existing rule is changed, it takes time for the effects to hit the market, and this can extend to existing programs. Starting and stopping programs increases attrition of trade allies and negatively impacts program delivery and customer satisfaction.

> The rules are so important. [To anticipate problems] we would role-play rules—as if we were aggressive contractors, only seeking money. We would also borrow ideas from other states. We started going to the PUC [Public Utility Commission] with proposed ideas proactively. This would solve 90 percent of the problems.
>
> *– John Hargrove, AESP*

Commercial customers' experience

Opportunities for saving energy and promoting energy investments abound in the commercial and industrial markets, and utilities have responded by developing incentive programs for those customers. But motivating them to act on energy efficiency opportunities is much harder than motivating residential consumers to do the same.

For most commercial and industrial clients, investment decisions are driven primarily by financial considerations, and even companies with a desire to promote "green" initiatives won't invest in them without a compelling return on investment. Availability of capital is not usually an issue; if a project can be justified with a business case, the capital can be made available to do it. The real issue is competition for that capital. The industry must demonstrate that energy efficiency is a better use of capital than other investment options, and business cases with case studies and data that support that claim can be effective in helping to secure the needed investment.

> If you can make a case that energy efficiency is a better use of capital than investing in a new salesperson, they are on it. So, we need to understand how commercial and industrial customers evaluate opportunities. A university may accept a 10-year payback, but a real estate company wants a payback of 3–5 years. Green is not a benefit: ROI is.
>
> *– Tilak Subrahmanian, Eversource*

Utility engineers implementing commercial energy efficiency programs in the field have several suggestions for improving them.

1. Greater clarity surrounding incentives would help streamline the development of stronger energy efficiency programs.
2. Utilities could help with research and development related to energy efficiency.
3. Utilities could provide benchmarking reports to their commercial and industrial clients, in an effort to help them understand their energy usage relative to their peers.

Optimizing customer outreach

How do we identify utility customers who are most likely to accept and benefit from energy efficiency programs? To optimize customer outreach programs, utilities have found it critically important to integrate programs and data.

There are homes with high energy savings potential but low propensity to invest in energy efficiency, and there are homes with low energy savings potential but a high propensity to invest in energy efficiency. We looked for the "sweet spot" in the market – a high energy savings potential and a high propensity for the resident to invest. We found that propensity to invest in energy efficiency was related to three variables: annual usage, home value and home equity. Home equity is the biggest contributor to this propensity.

One utility found that the propensity to invest in energy efficiency depends on three variables: annual usage, home value and home equity. Advanced analytics tools helped this utility dramatically increase energy audits and reduce the cost of customer acquisition for their programs.

Optimizing customer outreach — Continued

> The highest propensity to invest came when home equity was between one-third and two-thirds of value. What do you do with this information? We ran campaigns, control groups and test groups, and looked at the results. We used different messages for different groups—some segments heard about saving money, some segments heard about being green, some segments heard about comfort. We achieved a four-fold increase in energy audits and a 76 percent decline in the cost of [energy efficiency] customer acquisition. These are huge improvements! This gave us more cost-effective outreach and a better user experience.
>
> *– Tilak Subrahmanian, Eversource*

The future of customer service

With most consumer products, customer satisfaction increases sales. For utilities, however, there isn't always a direct correlation between customer satisfaction and the demand for electricity. This doesn't diminish the importance of providing a good customer experience. In fact, as technology improves and consumers invest more in energy, it is more important than ever to grow brand equity. This will likely turn the conversation toward new revenue streams, deepening customer relationships and generating new ideas.

According to one utility manager, with adequate storage, utilities could revolutionize the delivery of energy. What is the future?

How can we use data to sell power? What does the customer want help with that we, the utility, could provide? How can we leverage our relationship with customers? Can we branch out? These are important question for the industry to address collectively.

Innovation Outlook:
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Technology & Innovation

02

Big data and the Internet of Things (IoT)

The evolution of DR

Utilities and the electrification of transportation

Overview

As energy efficiency technology continues to evolve, the industry must continue looking for incremental benefits. Opportunities include managing distributed energy resources; bundling energy saving features with other desirable features in homes and businesses; more effective data utilization to improve efficiency, performance and customer satisfaction; and the management of loads through demand response programs (DR).

Utilities can also play a key role in educating customers on the use of electric vehicles and other related innovations, positioning themselves as trusted advisors to customers to help them make informed decisions about energy-related investments.

Big data and the Internet of Things

In the past, utilities' data needs were limited. But the growing prevalence of intelligence in our equipment, along with online, two-way communication with customers, gives us access to energy use data at a granular level that could not have been anticipated even a few years ago.

In the future, every part of the utility experience will be online. Home automation that allows temperature, humidity, etc., to be controlled from a smart phone is just the start. All this new technology is vulnerable to hacking, creating a need for data security innovations. This is a classic revolution: power is moving from the hierarchy to the network. The person at the top of the organization no longer decides what happens—decision-making is increasingly distributed, and utilities' customers are more empowered every day.

> We get great data and information from thermostats. We see the A/C units, and can turn them off or change the set-points. If we see that after an event, it takes six hours for the building to return to the set temperature, we can reach out to the customer and say, 'let us come out and tune up your air conditioning and, if you like, sign you up for our energy program.' This way, even with a four-hour event without air conditioning, we can retain all our customers.
>
> *– Gerardo Galdamez, Entergy Arkansas*

Big data and the Internet of Things — Continued

How can utilities leverage big data to benefit and better serve their customers? And how will big data change the utility industry?

"The goal of big data is predictive models," said one utility manager, who compared how a utility could anticipate what a customer will respond to with predictive analytics, such as anticipatory shipping, that have helped make Amazon so successful.

Utilities and program managers can use big data proactively to help determine whether existing equipment could be made more energy efficient prior to investing in new equipment. For example, a manufacturer who thinks it's necessary to procure more chillers to expand could leverage big data analysis to determine whether more equipment is needed or whether existing equipment could be used more efficiently.

Utilities and program managers can use big data proactively to help determine whether existing equipment could be made more energy efficient prior to investing in new equipment.

Utilities can use big data to enhance customer satisfaction. Two-way communication with customer devices is particularly useful to enable DR programs that do not inconvenience building occupants.

Spotlight on smart thermostats

Smart thermostats allow utilities to not only adjust temperatures, but also diagnose whether equipment is properly working, which can reveal opportunities for buildings to reduce energy use.

The evolution of DR

Energy efficiency programs and DR are two sides of the same coin and, therefore, can complement each other. DR optimizes the use of electricity when it's most valuable, ensuring that utilities and customers get the most value from energy resources and greater efficiency of the electric grid.

Ideally, DR promotes customer satisfaction while simultaneously reducing a utility's peak generation or transmission capacity requirements. Utilities can offer consumers a reduced total bill in exchange for the right to shed load when necessary—a win-win. DR is becoming a critical energy solution.

In the past, customers could find load shedding onerous, which compromised customer satisfaction. Now, with customer consent, enhanced rates data coupled with automated controls allows utilities to control events without customer discomfort. Increased artificial intelligence and data analytics can also potentially identify sites that could benefit from additional energy efficiency measures or equipment tune-ups.[3]

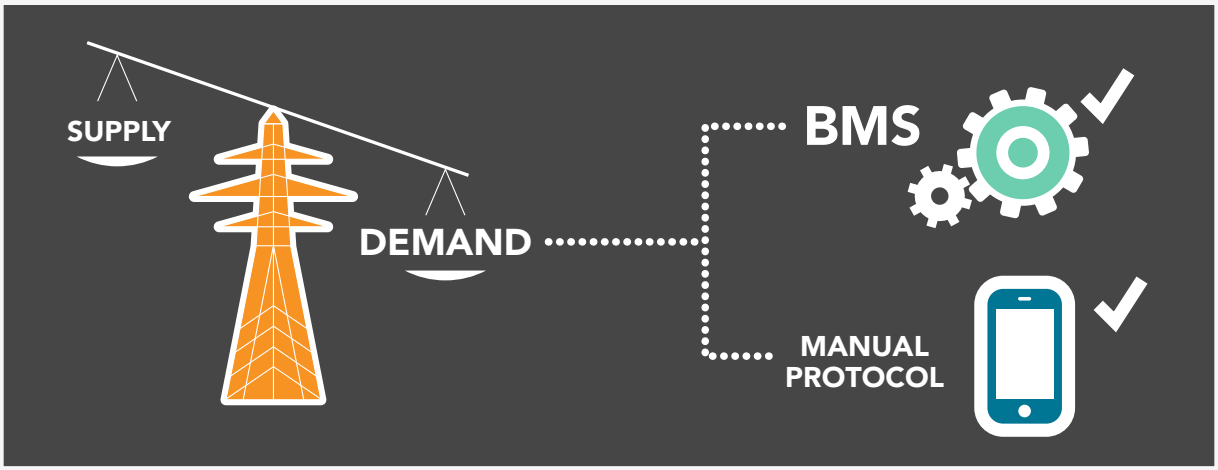
The management of DR is still evolving, and customers are contributing to the creation of future DR programs.

> In demand response, the trend is to go for both load shedding and customer satisfaction. With proper incentives, customers are happy with DR and accept the need to monitor, say, inside temperature. We install smart thermostats, which give us access to data from the installation and feedback on performance. With a smart thermostat, we have occupancy information that we can process and decide whether to turn DR on or off.
> So, we get customer satisfaction.
>
> *– Gerardo Galdamez, Entergy Arkansas*

[3] US Environmental Protection Agency, Assessing the Multiple Benefits of Clean Energy, P 135 https://www.epa.gov/sites/production/files/2015-08/documents/epa_assessing_benefits.pdf (September 2011)

The evolution of DR — Continued

In the commercial and industrial market, there are two approaches. First, there is automatic demand response: an event occurs and software executes load shedding. This leverages the Building Management System (BMS). Then there is manual: an event occurs, calls go out to the commercial and industrial network, and each site executes the protocol for demand response.



Utilities and the electrification of transportation

There are now more than 25 models of electric vehicles (EVs) in the market, thanks to rapidly decreasing energy storage costs. As the economic benefits of electrification become clear to fleet owners and mass transit providers, they are poised to rapidly boost their electrical consumption. As a result, utilities are focusing on managing these new and growing load sources. EVs can also be valuable to electric utilities as new sources of off-peak load growth and improved load factors, and they raise the potential for deployment of new capital.

Utilities are looking to develop a better understanding of the electrification of transportation in their service area and its likely impact on their loads and businesses. EV charging is one area of a particular interest. Also, utilities are hoping to gain more insights into the use of electric transportation through time of use (TOU) rate schedules. These schedules allow utilities to separately meter charging stations which allow them to create price signals that encourage consumers to charge while energy demand is relatively low. A benefit of TOU schedules is their ability to provide utilities with valuable insights into EV and charging behavior across service areas.[4]

[4] CLEAResult, An EE and DR Forecast for 2017 https://www.clearesult.com/news-events/news/an-ee-and-dr-forecast-for-2017/ (Jan 12, 2017)

Innovation Outlook:
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Utility Business Model

03

Challenges to the traditional utility business model
Energy efficiency earnings & profits
Welcoming the decade of electric cars
The impact of performance incentives on utilities
Innovation in utility business model

Overview

The traditional utility business model was relatively simple: produce electricity, sell it at regulated rates and earn a fixed, consistent and reliable rate of return. Under the traditional model, increasing load has led to increasing revenue which, in turn, has led to a higher rate of return and happy investors. By contrast, energy efficiency is intended to decrease load to realize the benefits such as decreased demand and stress on the energy system, which ultimately lowers costs for consumers.

While the concern is that these moves can lead to decreased revenues for utilities, energy efficiency programs boost economic development. So, how can we motivate utilities to pursue energy efficiency when their experience tells them that increased efficiency is not in the best interest of their bottom line?

If we hope to incentivize utilities to lead the way with energy efficiency, we need to articulate and institutionalize a utility business model that rewards energy efficiency. To successfully increase energy efficiency long-term, it will need to be in the best interest of utilities, their management and the investors who provide capital for future operations. That will require more substantial incentives than exist today.

> Utilities are now profoundly challenged by long-term economic fundamentals, new technologies, solar PV declining costs, third-party finance of solar PV, flat or declining load growth, volumetric tariffs, regulatory pressures and change, aging infrastructure—to name a few. In my opinion, these are not cyclic—these are long-term, permanent, and fundamental challenges. All those challenges are putting pressure on utilities to seek higher rates. We have seen that with the nuclear cycle back in the 1980s and the gas pipelines in 2005. Now, customers can aggressively pursue energy efficiency, or employ distributed energy resources. And as customers pursue those other alternatives, it creates a vicious cycle—increasing the challenges on utilities.
>
> *– Peter Kind, Energy Infrastructure Advocates LLC*

Challenges to the traditional utility business model

As technology matures, utilities are experiencing dramatic challenges to the industry's traditional business model. Consumers now install more efficient appliances and devices that allow for better control, and this is leading to decreases in energy consumption. As a result, the traditional business model must shift to meet the needs of all stakeholders: customers, utilities, policymakers and investors. It's no longer possible to operate a strictly commodity sales-driven business: our industry is moving toward value- and services-driven models.

The Energy Transformation session at the CLEAResult Energy Forum underscored the importance of this shift. In fact, the session took it a step further, putting stakeholder interests in a priority order: customers first, followed by utilities, policy makers and third-party competitive providers.

> What we want to do is set up performance incentive programs that drive and create value for customers, stakeholders and investors. We can create value by moving towards a value and services driven business, as opposed to a commodity sales driven business.
>
> *– Peter Kind,*
> *Energy Infrastructure Advocates LLC*

Energy efficiency earnings & profits

How can we move toward increasing energy efficiency in a way that increases participating utilities' return on investment? In some states, such as Utah, utilities can earn returns in energy efficiency investments. In New York, the Reforming the Energy Vision (REV) initiative is considering metrics that would reward utilities for reaching or surpassing efficiency, customer engagement and other targets. Utility rate cases are also possible pathways for new incentive structures. Regulators, who must approve various performance incentive mechanisms, are increasingly open to these types of ideas.

Welcoming the decade of electric vehicles

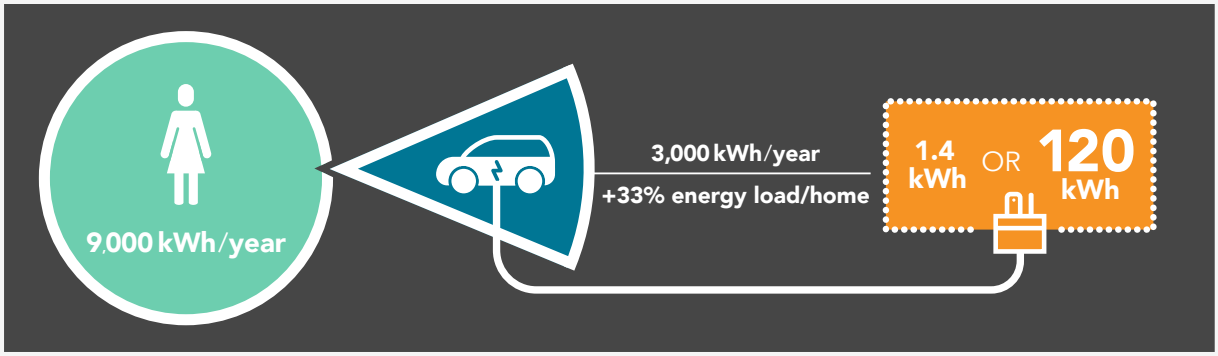
Electric vehicles (EVs) are potentially a source of revenue without requiring substantial investments in new generation. EVs charged off-peak improve load factors, increase electricity volume and have the societal benefit of lower emissions.

During the EV session at Energy Forum, one engineer predicted that 2020 will mark the beginning of the "Decade of Electric Vehicles," and that by 2022 EVs will cost the same as their internal-combustion counterparts, causing sales to take off. "Electric vehicles help the grid by promoting load growth at night, using base load plants. We estimate that each electric vehicle brings $2,800 to $9,800 of value to utilities."

By any estimate, EV potential cannot be overlooked, and, if managed correctly, this transition can help utilities not only become more efficient, but more profitable. Now is the time for utilities to become thought leaders among their customers regarding the benefits of electric transportation.

Industry outsiders and university researchers with fresh perspectives will also help fuel the growth of EV adoption with the increased deployment of wireless IoT technologies, allowing future EV owners to seamlessly move from connected homes to fully connected autonomous mobility systems.

An average residential user in Xcel Energy territory consumes roughly 9,000 kWh per year—and an electric vehicle at home consumes approximately 3,000 kWh per year. So, there is an opportunity for increasing energy use in homes with electric vehicles by up to 33 percent. When thinking about utility distribution planning, the charging speed and time is an influential matter. Slow charging at, say, 1.4 kW is equivalent to a blow dryer and is likely to happen at home overnight. But, fast charging at 120 kW is a big draw that might occur during the day at public charging facilities. In an effort to improve system utilization and keep energy costs low for all customers, Xcel Energy is exploring ways to help reduce the impact of electric vehicles on the grid through rates option and other programs. – Eric Van Orden, Xcel Energy



The impact of performance incentives on utilities

Defined performance incentive mechanisms are the most direct way to increase a utility's revenue while promoting energy efficiency. In order to be effective, these incentives must be scaled properly. Currently, incentives represent only 1 percent or less of a utility's income—an insignificant amount that is unlikely to change the utility's behavior.

Our survey of Wall Street analysts suggested that to gain the attention of utility executives and drive behavioral changes that encourage larger scale deployment of energy efficiency, performance incentives must raise earned returns somewhere in the range of 10 percent. Further, differentiating between a utility's investments in energy efficiency and other distributed energy resources versus traditional capital investments in costly infrastructure should help drive the move toward clean energy as well.

Over time, these increased earnings will translate into a more highly valued utility with higher equity value per share. Increasing return on equity approximately 1 percent—that is, raise return on investment from an average of around 10 percent to perhaps 11 percent, would attract investors, raise stock prices and provide management incentives that will motivate further investment in energy efficiency.[5]

[5] CLEAResult, Lower Spending, Higher Returns https://www.clearesult.com/insights/whitepapers/lower-spending-higher-returns/ (Dec 19, 2016)

Innovation in utility business model

Many utilities are looking to raise fixed charges to help balance the uneven impacts of increased grid defection and reduced electricity demand. But in some states, consumer advocates and some regulators are opposing them. According to Peter Kind, the lack of alignment between utilities' interests and those of their customers under the current cost of service model is bad for all parties involved.

We're still using the 20th-century utility business model of building rate base and growing earnings from that rate base. What's needed to break that gridlock is a new, 21st-century model focused on customer value, generating customer engagement, deploying new technology and creating more value for utilities' shareholders.

> With meaningful and well-structured performance incentives, some capital investment will be funded by incentives. So, the utility will have lower capital expenditures and therefore, lower funding needs and therefore, a lower rate base. Net income may be lower—but return on equity will be higher and therefore, stock price will be higher. This is an example of a win-win: with performance incentives, we allow and encourage distributed energy resources as well as energy efficiency, and we have created an incentive for utilities to accelerate that activity.
>
> *– Peter Kind, Energy Infrastructure Advocates LLC*

According to one utility engineer, "Regulation can get in the way of innovation, and a lack of creativity in the business model dooms companies. We need creativity in the whole utility system. The vision is energy efficiency, solar PV and electric vehicles; the nightmare is that utilities lose load and lose revenue. That is bad for either investor owned or public utilities."

Leadership from regulators and policymakers is needed to move toward a new, 21st-century cost of service plus performance incentives model that lets customers, regulators, third-party competitive providers and utilities all win.

Innovation Outlook:
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What's Next?

04

What technology has in store
Adapting to energy's radical future
Full speed ahead

Overview

Energy is the foundation of economic growth that increases the welfare of everyone. Yet, as an industry, we recognize the need to reduce the impact of power generation on our environment. The future of energy will be created by balancing these competing needs. There are certainly obstacles and challenges to achieving this.

Our CEO Aziz Virani spoke about headwinds and tailwinds for utilities and how daunting all this change can be. If there's one thing we've learned—year after year—it's that there's much we can learn from each other. We're not facing the future alone. And we get there by tackling our challenges together, one action at a time.

What technology has in store

The challenges ahead may be growing, but so are the possibilities. Each year, professionals in the energy field become more and more optimistic about the future. The costs of renewables, storage and energy efficiency continue to decline rapidly. This will allow for greater viability and increased growth in both residential and commercial and industrial adoption of advanced energy technologies.

> Solar energy is following the same exponential rate of change we saw with Moore's law. If solar electricity continues its current learning rate, by the time solar capacity triples to 600 GW—roughly 2020—we should see unsubsidized solar prices of $ 0.045 to $ 0.065 per kwh.
>
> *– David Rowan, WIRED UK*

Adapting to energy's radical future

How do you react to change? Denying it risks your organization being left behind. David Rowan of WIRED UK magazine used the example of a 2007 television appearance by then-Microsoft CEO Steve Ballmer, who said he didn't see the $500 iPhone as a threat. In fact, Ballmer made fun of its lack of a keyboard which would make typing emails difficult, rendering the phone unsuitable for business use. Rowan pointed out the parallels with the coming wave of innovation in the energy market in the next few years, saying "It all comes down to how you respond."

Rowan emphasized the importance of developing "an innovation culture" and of creating "a space where people can learn together"—not just within our organizations or even our industry, but also from those outside, as we move forward into uncharted territory.

> How do you stay on top of all these changes? How do you change the way your organization thinks? You need an innovation culture. Like Zappos—obsessed with "collisions, co-learning and connectedness." Crazy stuff is happening—mining asteroids, 3-D printing of cars, interacting with machines via virtual reality goggles. Or stimulating monkey brains to type Shakespeare. Reframe the problem; monitor the edge cultures. Don't just look inside your own organization—look at the edges. Create a space where people can learn together.
>
> *– David Rowan, WIRED UK*

Full speed ahead

With so many shifts in the industry, there is a need to press forward into the new innovative world. Our industry must embrace change and jump at the chance to innovate and learn together.

Our industry must take the opportunities that are already in front of it and change with them. The focus must go towards new renewable energy sources, new forms of storage and new ways to create more energy efficiency. All of this needs to be done with the customer at the center of each change.

According to Edison Electric Institute's Executive Vice President for Public Policy Brian Wolff, "if it doesn't fit into clean energy, grid modernization or a focus on the customer, we're not doing it anymore."[6]

Whether led by customer demands, new competitors or simply the need to innovate, seismic shifts in the energy industry are here.

[6] Stephen Lacey, the Edison Electric Institute's 2016 Goals Are a Bellwether for Utility Sector Change https://www.greentechmedia.com/articles/read/the-edison-electric-institutes-internal-goals-for-2016-are-a-bellwether (May 5, 2016)

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Carl Lepper, Senior Analyst, Utilities & Infrastructure Practice, J.D. Power

Doug Lewin, Vice President, CLEAResult

David Rowan, Editor, WIRED UK

Tilak Subrahmanian, Vice President, Eversource

Eric Van Orden, Strategic Segment, Team Lead, Xcel Energy

Aziz Virani, Chief Executive Officer and President, CLEAResult

Agenda: CLEAResult Energy Forum 2016

The following chart lists the keynote addresses and technical sessions from the 2016 conference. CLEAResult would like to thank all of the speakers.

Wednesday 10.5.16

Tilak Subrahmanian, Eversource: "Innovating from the Outside"	Innovating Outside
Getting a Grip on Growing Levels of Distributed Generation Resources	Distributed Generation
Lights, Standards, Action: Planning for Regulatory Impacts on Lighting	Planning Lighting
Customer Experience: From Theory to Practice	Customer Experience
Smarter Strategies for Smart Homes	Smart Homes
CHP: New Approaches Could Change the Industry	Heat & Power
On the Road: The Future of Natural Gas Vehicles	Gas Vehicles
Demand Response: The DR is IN	Demand Response
Big Results from Big Data	Big Data
What's New with Blue? Emerging Tech in Natural Gas	Gas Tech
Partnering for Success: Driving Utility EV Adoption	Electric Vehicles

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Agenda: CLEAResult Energy Forum 2016—Continued

The following chart lists the keynote addresses and technical sessions from the 2016 conference.

Thursday, 10.6.16

JUMP Innovation Finals	JUMP Finals
David Rowan, WIRED UK: "The Speed of Innovation: Why Your World Will Never Move This Slowly Again"	Speed of Innovation
Peter Kind, Energy Infrastructure Advocates LLC: "The Energy Transformation: Turning Challenges into Opportunities"	Energy Transformation
A Closer Look at the Future of Utility Business Models	Utility Business Models
Trade Allies: The Unsung Heroes of Program Delivery	Trade Allies
Catching Fire: Best Practices for Natural Gas Programs	Natural Gas Programs
Peer Assist: The Better Buildings Residential Network	Better Buildings
Making the Connection: A Commercial Customer Insights Panel	Commercial Insights
News You Need to Know: Insights from Industry Media	Industry Media

Join the conversation—next year!

We look forward to seeing you at the CLEAResult Energy Forum 2017 where you can participate and shape our industry's thinking:

clearesultenergyforum.com

We're changing the way people use energy, helping utility clients implement programs that provide incentives to end customers that enable them to be more efficient with their energy consumption. We do that by educating consumers—the homeowners, the residential customers, the business customers—and demonstrating that smarter, more efficient energy consumption is not only good for the environment, it's good for them, too, by reducing their utility bills and making their homes and businesses more comfortable. We use education and incentives to create a win-win scenario between our primary client, the utility company, and the end, which benefits the environment overall.

So, it's ultimately a win-win-win situation.

– Aziz Virani, CLEAResult

Learn how CLEAResult can help you change the way you use energy.

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