

21ST CENTURY ELECTRICITY SYSTEM CEO FORUM SUMMARY

BOSTON, MA

On March 5th, 2014, leaders of electric utilities, regulatory agencies, and advanced energy technology companies met at the headquarters of EnerNOC in Boston, MA, for the fifth 21st Century Electricity System CEO Forum co-hosted by Advanced Energy Economy Institute (AEEI) and MIT's Industrial Performance Center (IPC). Attendees met to discuss the path forward for technology, regulatory, and business model innovation in New England's power sector, with a focus on Massachusetts, Connecticut and Rhode Island.

The key themes of the meeting were:

1. The proliferation of new technology, an evolving policy environment, and changing customer needs and expectations have unleashed a set of powerful trends reshaping the utility sector today; these trends are distinct from patterns of change the sector has faced in the past.
2. Electric utilities will take on a variety of new roles in the changing power sector in order to integrate new technologies and offer a range of differentiated services to end users.
3. Regulators must update how utilities are remunerated and how electricity products and services are priced in order to pave the way for innovation and enable utilities to take on new roles and offer new services.

The changing electric utility industry

"We've been down this route of talking about new business models for utilities before. This is not the first time we've had rooms and discussions like this. So I have to ask: what is it this time around, that's different?"

This question set the stage for a discussion of what distinguishes the changes facing the electricity sector today from the pattern of changes the sector has experienced previously. From regulatory restructuring to integration of new technologies, the industry has grappled with disruptive changes in the past.

Today, a new set of changes is once again reshaping the power sector, and these trends have unique features that stand apart from the past. New technologies are enabling business models that were never before possible. Customer expectations and demands are changing against the backdrop of flat or even decreasing load, creating new opportunities and challenges for utilities. Meanwhile, policy makers have set new priorities for the electric power system, from enhanced resiliency and cyber-security to improved environmental performance and climate change objectives.

"We looked at our customers and asked, 'What do our customers want?' We realized they don't want to be in the dark, literally or figuratively."

"Our customers want more information about their energy use and system. And our regulators, public officials, and towns want more information as well, when there's something that goes wrong, blue sky day or storm."

Attendees pointed out that the Internet is making available to customers and utilities a range of fundamentally better energy solutions. Information and communication capabilities are enabling access to more data and more informed decision-making, and customers are increasingly demanding access to this information. At the same time, control over the power system is no longer restricted to the supply side. Increasing communication between the utility and the end-user is expanding opportunities for control on the demand or customer side as well.

"I think this is the first time we're moving from a 'one-dial' system to a 'two-dial' system for utilities. What I mean is that utilities used to have only one dial to control the system: the supply side. Now we're creating a second dial on the demand side and customer side. That creates more alignment between the utility and end customer than ever before ... you can now dial the demand side up or down in a way you could never before."

Even as new technologies are reshaping the power sector and enabling unprecedented interaction between utilities, third party providers, and the end-users, the regulatory and policy infrastructure governing the power sector has also started to change. These changes range from incremental to more foundational. For example, Massachusetts is in the midst of a major Grid Modernization proceeding, and New York has just recently embarked on a proceeding called Reforming the Energy Vision. Forum participants mentioned heightened concern with grid resiliency, climate change-related policy objectives, energy efficiency priorities, and the integration of renewable energy to meet state RPS requirements, as key policy drivers affecting the electric power sector.

Many of these regulatory and policy drivers are enabling the development of new markets and new business models for both utilities and non-utility companies. At the same time, some meeting participants argued that -- novel technologies and new market entrants aside -- utilities are still well positioned to solve new challenges and meet new demands in the power sector.

"The one thing that hasn't changed in spite of new technology and policy is that the folks who are best positioned to solve these problems are the folks that are running utilities."

At the same time, it was noted that there are huge entrepreneurial opportunities associated with developing a 21st century electricity system, especially in New England, which has a strong innovation economy.

The new roles of the utility

"The utility's job is to be the platform for innovation, to give the market the opportunities and move that innovation through."

Subsequent discussion explored how the role of the electric utility would evolve amidst the set of forces reshaping the power sector. Participants noted that the utility is a vital link between the requirements shaped by policy and customer demands on the one hand and the technology and market solutions available to meet those requirements on the other. Looking forward, participants identified a series of key utility roles, including:

1. Updating, operating, and maintaining a resilient backbone system that will face a host of new demands for which it was not originally designed. These include integrating distributed energy resources and renewable resources.
2. Providing an increasingly differentiated range of products and services to customers who want more than a basic level of service. Various new functions can potentially be fulfilled by existing utilities or by third party technology or service providers.
3. Enabling customer engagement – ranging from automated load control to engaging customers in daily decision-making – by giving customers the tools to make new choices and become active market participants.

“The world today has changed rather dramatically. ... Everybody is talking about strengthening and modernizing the grid. The big question for us is what does that mean?”

Offering a diverse suite of solutions to customers will constitute a shift in the utility's core business. Utilities will move away from the commodity delivery of electricity to become providers of electricity as a service, enabling a richer array of options for customization. This evolving role for the utility raises important questions about which are the right products and services to offer, how and to what extent services should be differentiated, what basic level of service should be guaranteed for all customers, and how should these new service offerings be valued?

Regulatory redesign

“The first step to modernizing the grid is to modernize the way we do regulation.”

There was general consensus amongst meeting participants that in order for utilities to fulfill new roles and offer new products and services, regulatory changes must be implemented. Participants drew parallels to the regulatory experience with energy efficiency (EE), noting that the successful implementation of EE programs in many states are a result of progressive regulatory models that have created markets for efficiency and aligned the incentives for third parties and utilities. Such regulation was designed to resolve uncertainty over how utilities could recover investments in EE and how their revenue streams would be impacted, clarify the roles played by utilities and third parties, and define who benefits and who pays for EE.

Updating the regulatory regime to accommodate and integrate new distributed energy resources must now similarly address three regulatory challenges:

1. How do we establish utility revenue requirements and update remuneration schemes to align utility incentives to accommodate distributed energy resources (DER) and integrate the services they can provide to the grid?
2. How do we design distribution network rates to ensure fair allocation of costs and efficient integration of DER?
3. How do we define the roles and responsibilities of utilities and third parties?

“I think [regulation is] where we need real evolution or revolution in thinking...How do we throw away the old paradigm...Do we really have the guts to change the regulatory model and price things the way they need to be priced?”

“Many in the industry see the impact of local generation and energy efficiency as a deflationary pressure for the distribution utilities' revenue. I think that if we open up the constraints from a regulatory perspective ... I think what we'll find in the electricity industry, much like in [telecommunications], that the revenue opportunities in aggregate actually go up, because you can deliver new services. That's an incentive for moving forward.”

Multiple participants noted that determining revenue requirements for distribution utilities should shift away from fixed cost recovery through volumetric sales and move towards performance-based remuneration. This calls for defining clear, credible performance requirements for utilities. Performance could be measured according to the delivery of value-added services including reliability, efficiency savings, and more information about the services being provided to and paid for by end-users. Models of successful implementation of performance-based remuneration with revenue caps exist in the natural gas and telecommunications sectors in the United States, and the power sector in Europe, and may be an effective route for unlocking innovation amongst electric utilities.

“If the right incentives are there, it will force the utility to do things that will benefit their customers. From a ratemaking perspective, we've been very successful with performance-based rates [in the natural gas sector].”

“The volumetric product is what's killing us. That's the historic legacy. We got stuck with the meter. ... We think everything has to be priced off the meter. It doesn't. The issue now is the environment, not how many kilowatts we can shove through the pipe. These are complicated things, but we have to throw out old thinking and figure out how to price products now.”

Meeting attendees emphasized that an updated remuneration scheme should incentivize utilities to view DER owners as customers and system users with unique needs to be served. The regulation of utility remuneration and rates should capture the full benefits and costs of network use behaviors and incentivize utilities to view network users not only as consumers, but also as providers of services to the utility.

“When we talk about energy efficiency and distributed generation, it's talked about as if people are 'doing something to our system' and we have to figure out how to make them pay for that. We want to get beyond that. These are customers with new demands on the system. We want a regulatory compact to let them do that and for the system to take advantage of new capabilities to operate more efficiently for all customers.”

The second key regulatory question that participants discussed was the challenge of setting fair prices for services, including designing rates for use of the distribution network by DER customers. Participants argued that fair use-of-distribution-system charges should allow utilities to recover their costs and meet their obligations without driving customers off the network through rate increases. The current pricing of network use – which is based on volumetric energy sales – fails to capture the impact of peak capacity requirements on network costs. Network rates should reflect the full costs and benefits of DER connection and operation, thereby incentivizing DER integration rather than mere interconnection.

“We have to start by looking at the product we are providing and pricing it accordingly. We can't send benefit signals if we can't price basic service. We're on a 100-year-old pricing model. It was based on power plants. When we deregulated, everyone patted themselves on the back. But we didn't deregulate. We deregulated power plants but not the delivery model or the pricing model.”

Price signals should encourage network users to engage in efficient utilization of the distribution system, including optimal siting and operation of integrated DER. Participants pointed out that while time varying rates have been discussed for many years, only now do the technology and business models exist to enable customers to change their behaviors in response to price signals. Attendees emphasized that the design of time varying rates consists of multiple rate components, including energy commodity sales and distribution network utilization, and each rate component communicates different signals about system user behavior.

“You don't have the same rate for everyone. You look at where is that distributed generator most valuable, or what time of day we should charge less to encourage people to pre-heat water heaters for example. That will ultimately be key.”

Greater differentiation of customer demands and service offerings increases the complexity of determining revenue requirements and allocating that revenue across network users. In environments where customers receive different levels of service, meeting attendees asked how utilities should invest to address different service levels, and if only a subset of customers demand a particular service, how should utilities allocate costs across the customer base?

A final regulatory challenge concerns defining the evolving role of electric utilities and clarifying how and when existing utilities can compete with, or contract with, new market entrants. If a regulated utility is providing a service that can also be provided by non-regulated third parties, how should that service be priced, and how do regulated and non-regulated entities interact?

“We [advanced energy technology companies] need the utilities to be partners to be the platform for innovation. What I’m hearing today is maybe they will not just be the platform but also build some of these innovative solutions themselves.”

Summary and next steps

This Forum concludes the year-long series of 21st Century Electricity System CEO Forums convened jointly by AEEI and the MIT Industrial Performance Center. The series, which began in Massachusetts in early 2013, and continued in Texas, Colorado, and New York, before returning most recently to Massachusetts, has revealed the contours of the rapidly evolving debate about the future of the nation’s electric power system, in which utilities, regulators, and advanced energy technology companies are all responding to fast-changing circumstances in the power sector that could hardly have been predicted even a few years ago. The forums have focused attention on the strategic challenges facing these participants. They have shown that the challenges in the power sector are pervasive, but that the pathways for progress are likely to vary considerably from one part of the country to another. Most important, these forums have demonstrated the value of constructive debate and engagement among industry participants. It will be important to continue and broaden these discussions, and both AEE and MIT are pursuing new initiatives that build on the findings of this series. In the meantime, we take this opportunity to thank all of the participants in the forums for their exceptionally valuable contributions to the series.

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