

# 21ST CENTURY ELECTRICITY SYSTEM CEO FORUM SUMMARY

**HOSTED BY CPS ENERGY, SAN ANTONIO, TX**

In the second in a series of regional roundtables held by Advanced Energy Economy (AEE) and the MIT Industrial Performance Center (IPC), electricity industry executives and advanced energy technology providers convened at CPS Energy in San Antonio, Texas on June 18th, 2013 to discuss the path forward for accelerating innovation in the power sector. Underlying the discussion was an appreciation of the role of both evolutionary and disruptive change and the different challenges that each present to power sector participants. The meeting facilitated dialog among multiple stakeholders - regulators, utilities, system operators, retailers, advanced energy technology companies - about the development of new regulatory frameworks and business models to best meet innovation challenges and harness new opportunities. With its focus on regional innovation, the roundtable aimed to draw lessons from the Texas experience and potentially apply them to other regions.

Four key themes emerged from the discussion:

1. Develop innovative business and regulatory models that enable risk sharing between load-serving entities and providers of new technologies and services
2. Focus on innovation in retail services to meet differentiated customer needs
3. Enable the movement of low-cost capital to where it is most needed; and
4. Develop a shared strategic vision that enables load-serving entities, other market participants, and regulators to work towards solutions to well-defined challenges.

Below are summary notes from the forum.

## 1. Develop innovative business and regulatory models that enable risk sharing between load-serving entities and providers of new technologies and services.

Participants identified enhanced risk sharing as crucial to the advancement of innovation in the power sector. Business and regulatory models that allow utilities to better share risk with advanced energy technology and service companies are necessary for the integration of new technologies.

Required to comply with statutory provisions and case law and deliver reliable, affordable power, utilities generally exhibit lower risk appetites. Additionally, firms that face a constrained rate of return have little incentive to assume higher risk for higher reward. This was also a central message in the previous AEE/IPC meeting held at MIT.

Meeting participants underscored this mismatch between the risk reward frameworks used by investor-owned utilities (IOUs) and advanced technology and service companies. Investors in advanced energy companies often require rates of return of 20% or more for their investors while utility shareholders expect lower, but steady and predictable returns. A crucial challenge is how to overcome the mismatch between these investment models.

One rationale for technology and service providers to explore partnerships with utility companies is the lower cost of capital available to the latter.

Public-private partnerships were emphasized as key tools for securing lower costs of capital and accelerating the integration of clean energy technologies in Texas. Participants from advanced technology companies pointed out that they tend to partner with utilities in order to stay attuned to customer needs and not get too far out in front of the utility customer. The lack of understanding of customer needs was cited as a challenge that needs to be resolved between technology companies and utilities.

Aligning incentives for utilities to incorporate and adopt innovative technologies and services calls for additional changes to business models and regulatory schemes. For example, a shared savings business model would allow customers and shareholders to share risks and potential rewards and allow utility earnings to exceed the mandated rate of return. Shifting risk to shareholders has attracted innovation to the ERCOT market: if an advanced technology investment proves unprofitable, shareholders - rather than ratepayers - assume the risk.

***“There is still a clash of civilizations – old hard-wired utility guys like myself who think about asset base and reliability versus, on the other side, people who look at the world on a micro level and have a higher risk appetite...”***

***“Inexpensive cost of capital for projects is important... one of the things that I like is that my second largest cost component behind fuel is the cost of [capital] – so if I can partner with a utility to bring us their cost of capital – 2% to 3% rather than my 6% cost of capital – then everybody wins.”***



In Texas, since restructuring in 2002, the electric industry has been split into two organizational models:

- 1) the retail choice model, consisting of elements of traditional investor-owned utilities, along with dozens of new market entrants, and
- 2) the electric cooperative/municipally-owned utility model, consisting of vertically integrated utilities which were left relatively unchanged by the restructuring law. Meeting participants highlighted the importance of local market conditions and specificities in the design and success of alternative business models.

However, participants also suggested that, while multiple market structures call for multiple strategies, no single market structure is best or worst for encouraging innovation. Rather, each market design presents a unique set of challenges and opportunities and the issue is how to get the most innovation within each type of structure.

Some examples of the opportunities offered by diverse market structures to accelerate innovation included giving customers access to day-ahead or real-time wholesale market price signals.

In addition to modified business models, participants called for greater streamlining and simplification of the stakeholder approval process for new, innovative ideas.

***“Texas really has a diverse set of different market models, and to address innovation, you have to understand which market model you’re talking about: if you’re talking about Houston and Dallas, one set of circumstances holds; in San Antonio or Austin, you have a different set of circumstances.”***

***“I don’t think a particular market structure encourages more innovation than another; each market has its pros and cons. The world has changed a lot since the market structure of ERCOT was developed. We have a lot of innovation in vertically integrated markets...this group is not trying to decide what’s the best market structure...but within a given market structure, how do you get the innovation? ”***



## 2. Focus on innovation in retail services to meet differentiated customer needs

Participants called for business and regulatory models that enable greater differentiation of product and service offerings to diverse customers. Texas, like all regions, has multiple types of customers, and could benefit from greater flexibility in offering differentiated services at differentiated rates.

Challenges to the “organic” emergence of innovation in the utility sector include requirements for non-discriminatory rates and services and comprehensive regulations governing market entrance. Addressing such challenges requires creating spaces in which new technologies and services can flourish. This could include establishing unregulated carve-outs for value-added services or moving forward with pilot programs and test beds. Ultimately, regulators and industry leaders must have a shared vision around the opportunities for new services to enhance offerings to customers.

Central to the development of any new end-use products and services are the customers. As customer needs and demands evolve with the products and services that can be offered, new benchmarks of customer satisfaction emerge. Customers are increasingly conscious of environmental performance and improved convenience. Revenue schemes such as performance-based rate regimes present utilities with an opportunity to earn more for meeting a higher level of customer satisfaction. Currently, however, the regulatory approval and permission process required for pilot programs for new services hampers the pace of innovation. This highlights the importance of bringing utility and advanced technology players together with regulators in order to successfully advance innovation in the industry.

A high degree of retail competition in ERCOT presents additional opportunities and challenges for power industry players and customers. Participants recognized the benefits that retail choice offers to customers. With the ability to choose their electricity providers, customers are more aware of electricity costs and are more educated about their electricity bills.

***“Unless we engage the end consumer in this conundrum we are going to be unsuccessful.”***

***“It is clear that we have new types of services to deliver to end users. There are new opportunities to innovate, new opportunities to differentiate products. But the takeaway is that it is very hard in this sector for new kinds of services to emerge organically.”***

***“Almost irrespective of the regulatory framework, innovative new products and services just have to be something that your company, shareholders, and/or community see as valuable. They have to weigh some of the local intrinsic things for your community, your company, your shareholders.”***

***“Retail as a business is here to stay. We’ve had a lot of startups and companies and utilities from around the country entering the market.”***



Numerous successful retail companies have emerged in ERCOT; however, customer churn still presents challenges to retailers by increasing uncertainty about asset payback periods. Customer churn discourages long-term investment because companies face a high degree of uncertainty over their customer base three to five years into the future. This presents a key obstacle to innovation. Customer switching risk is mitigated for cooperatives and municipal utilities in ERCOT because they have been permitted to opt out of retail competition. With an assured customer base, some of these companies are willing to assume more innovation risk. 'Virtual' integration of competitive generation and competitive retailing can also provide synergies and reduce innovation risk.

### **Reliability and resilience**

An important consideration in new service offerings is the requirement for reliability and resilience. There are opportunities to build a hierarchy of needs around reliability and resilience, to 'productize' reliability for customers, and to measure power service according to its resilience and reliability rather than its cost alone. Increased interconnectedness – through, for example, the Internet – has led to much greater customer awareness of the impact of power outages. As a result, resilience and responsiveness are increasingly crucial features of electricity service.

One approach to distribution reliability is to value the product based on differences in customer willingness to pay for it. Legal requirements that rates not be unduly discriminatory make it difficult to take advantage of different elasticities of demand and requirements for reliability. And in competitive retail markets, price offerings that promote elasticity have been slow to develop.

Reliability is broadly related to resource adequacy. The latter is a planning mechanism designed to ensure that over the long term adequate resources are available to meet the load, while reliability is associated more with operations than planning. Distributed generation is a resource capable of enhancing both reliability and supply adequacy. Some participants suggested that opportunities might arise to maintain electricity supply security and reliability for a particular service – such as Internet connectedness – while whole-system reliability would remain within the scope of ERCOT's responsibilities. Customers could choose (opt in) to have an assurance of reliability for a particular service. Any scheme to productize reliability will require consideration of the implications for service provider roles, data access, opt-out allowances, and more.

***"Utilities have always thought about reliability, but the customer hasn't – now it's sort of a new thing for customers to think about."***

***"As an ISO, we strive for resource adequacy. Adequacy sounds like an unambitious goal, but that's the key to keeping the grid reliable over the long term."***

***"We need to focus on new ways to maintain reliability, but enhance service quality, resiliency, etc."***



### 3. Enable the movement of low cost capital to where it is most needed

The discussion explored ways to accelerate innovation through greater private sector investment in the electric utility industry. Participants identified the need to move capital more quickly into key areas without being encumbered by regulatory challenges.

***“We do have a big problem in Texas and that’s that we need capital to invest in innovation.”***

In one view, a particular challenge in Texas is access to low-cost capital in the competitive retail segment. In another view, now that the recession in Texas is over and house prices are increasing and the oil and gas industry is thriving, this is creating more opportunities for innovation without changing the business model. As such, resources such as solar and combined heat and power (CHP) fit well into the existing market design, even in the context of low gas prices, but are not being exploited to their full potential.

Texas continues to debate whether or not the creation of a capacity market is key to encouraging investment in new generation. Some participants expressed confidence that the development of a capacity market in Texas would accelerate, not impede, the deployment of distributed energy resources (DERs), while others pointed to the benefits of an energy-only market. Still others suggested that the stalemate over the development of a capacity market may mean that a ‘third way’ is needed.

Ultimately, meeting participants noted that existing regulation impeded the development of multiple business models that would match different levels of risk and reward. For example, this may take the form of defining a base level of services that all individuals need and should receive, and then defining and valuing services that people need beyond the base level.

### 4. Develop a shared strategic vision that enables load-serving entities, other market participants, and regulators to work towards solutions to well-defined challenges.

A bottom-up approach to innovation is vital, but participants also emphasized the importance of creating a shared strategic vision across the state, as this will enable stakeholders to work effectively with regulators to address innovation challenges. Participants recognized their roles in informing regulators about the availability of innovative technologies and how to overcome roadblocks to their adoption. For example, access to real-time customer-use data is a valuable tool for energy management, and will be facilitated if users and utilities work collaboratively to identify what can be done to grant such access.

Development of a shared vision will help inform questions of regulatory and market structures. For example, while there appears to be broad agreement that solar and demand response are worthwhile opportunities to pursue, there are differing views within the community of stakeholders over whether integration of those resources should be market based or mandated by regulators.

***“We have a new window of opportunity right now in Texas...a rapidly growing economy, low gas prices, a lot of new technologies that are getting to be cost competitive and look like they could provide an opportunity going forward; and the challenge of how we develop reliability...”***

***“We’re at a turning point to create a shared vision, but we’re having a polarized debate about what the right market design is.”***



Strong leadership is needed to provide a unifying vision to guide the evolution of the industry.

Participants also highlighted the importance of greater convergence across the 50 states and their regulatory commissions and the value of input by organizations like AEE and MIT in finding a way to facilitate discussion among regulatory bodies in different parts of the country.

### **Moving Forward: Pilot Programs**

The conversation in San Antonio reinforced what was said at the MIT roundtable: we need to design and implement more pilot programs to field-test new ideas and concepts.

Ideas and concepts that are currently in place or being tried in ERCOT include:

- Pilot programs to integrate both demand response resources requiring 30-minute lead times and weather-sensitive loads such as residential air conditioning into ERCOT's emergency response service.
- A pilot to enable the use of storage devices and other resources to provide fast response regulation service. For example, batteries are utilized at substations adjacent to wind installations for frequency regulation.
- Over a decade of experience with demand-side resources providing responsive reserves.
- Over six million advanced meters deployed across the competitive choice territories in the ERCOT region. The customers served by this advanced meter infrastructure now have the capability to have any demand response actions measured and verified, and also to allow such actions to accrue directly to the benefit of their load-serving entity, creating the potential for new customer incentives.

***"You can't come in with a new approach from the outside. You can't just transplant some regulatory structure that works elsewhere. You must have all the interests aligned and have a window of opportunity. All interests have to come together."***

***"Because the grid is interconnected across the country, we need a vision from the bottom up to encourage innovation within the end-to-end system. On the other hand, the federal government has mandatory requirements, and we also have cyber security issues. With interconnection, for example, in the West and the East, we need a vision that will carry innovation beyond the bottom up."***

***"At the end of the day you have to get something on the ground...we need to have a lot of things bench tested. Some will work, many will fail...but some things will emerge with concrete business cases. But we need to get those things out."***



In order for pilot programs to prove effective, they must be technology neutral. Pilots should be structured around a particular service or offering, rather than around a specific proprietary technology. Some successful pilot programs in Texas have begun with the development of ground rules for the intent and goals of the pilot, approval by the public utility commission, and a clear definition of the pilot scope that is consistent with accepted protocols. Participants underscored the role regulators can play in promoting innovation through policy decisions about pilot program guidelines, market structure and lower barriers to entry, although many innovations can be piloted without regulatory approval or oversight.

Openness toward innovation and experimentation is what makes the Texas energy market one of the most dynamic in the country. Innovations of the kind listed above, as well as supporting entrepreneurial efforts such as SURGE (a program that provides mentorship, access to the energy ecosystem, and capital to new energy ventures) will continue to make Texas a magnet for new ideas and resources in the energy field. While Texas continues to build upon and improve its own regional models, it can also act as a test-bed for the rest of the country.

### **Next Steps**

As in the first AEE/IPC roundtable, participants in the San Antonio meeting underscored the opportunity to work collaboratively to reduce barriers, unlock innovation and monetize the benefits of innovation. In addition, they emphasized the value of a bottom-up approach that creates a shared vision at the regional level for developing and implementing innovative models that are resilient and reliable while also responsive to new market opportunities.

AEE and the IPC will work with roundtable participants across the roundtables to develop new frameworks and models for promoting differentiated products and services in the electricity market, and to develop specific test beds and pilots that can be launched in different regions. At the next roundtable – to be held in Aspen in August, 2013 -- participants will address these specific goals.

***“Texas can be a lab of innovation, and then we can export it to other places.”***

***“This is an important time – there hasn’t been as much change in the utility business in the last 100 years as in the last five to seven years. The old model was that the utility has an obligation to serve the customer reliably and safely. That model still holds, but now we also have different market segments to cater to.”***

***“In a 100+ years in this industry, industry change has tended to come from regulatory change. But I like the bottom up approach because while regulatory policy may be driven top down by the interaction between regulators and vested interests, it definitely would also be driven by bottom up from customer demands and bottom-up requests – regulators would respond.”***

***“There is a need for a higher level of unifying vision that has a systems focus... when we think of society today and how connected we are to the grid in our communication, in our business practices, etc., this notion of reliability and resiliency is crucially important in shaping that future society and culture.”***



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