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Ways for utility regulation to grapple with new developments in the U.S. Electric Industry

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ABSTRACT

The growing consensus is that the U.S. electric industry will undergo a major transformation over the next several years. This transformation will not necessarily occur evenly across states. In fact, the degree of transformation is likely to vary across states, just as the electric industry saw a diversity of state responses toward retail and wholesale restructuring in the 1990s.

The growing consensus is that the U.S. electric industry will undergo transformation over the next several years. Major developments in technology and energy policy point to important changes in the electric industry. While even this favored policy narrative among experts is no guarantee of the future, it is dictating the ongoing dialogue across the country about possible new actions at both the state and federal levels. This article does not predict that transformation of the electric industry will occur evenly across states. In fact, it argues that the degree of transformation will vary across states, just as the electric industry saw a diversity of state responses toward retail and wholesale restructuring in the 1990s.

This article outlines the topics and issues that state utility regulators should examine in line with a changing electric industry. We have seen initial and sometimes heated debate on these topics and expect it to continue over the next several years. What this article offers in this dialogue is a public-interest perspective that is essential for good public policymaking.

Two fundamental questions will drive the dialogue: (1) What role should utilities play? and (2) How should state utility regulators control utilities in fulfilling that role? Many experts believe that utilities will have to operate under new business models to prosper, and even survive, in the new market environment. Many observers contend that the *status quo* or traditional regulation is not compatible in an environment in which distributed resources, the smart grid, rising average costs, high investment requirements, and energy storage prevail. Under a reshaped utility business model, regulators might want to consider a new ratemaking paradigm that, first, rewards exceptional performance and, second, gives utilities incentives to promote customer and societal interests. In arriving at a final resolution, regulation will likely need adjusting, so that it operates in conjunction with a new business model.

1. Where do we stand today?

The favored bets as of today predict that the utility of the future will have a radically different role and business model than what exists today. If that is true, then state utility regulation will have to reshape its policies and practices to align with the new industry. A contrarian position is that it is presumptuous to say with certainty that the industry will transform dramatically, notwithstanding the trend toward so-called game changers in the form of renewable and distributed energy, power storage, and the inexorable movement toward clean energy. To disregard any doubt about the future would be wrong, as we have learned from the past that "certain" events, for various reasons, often fail to transpire. A transformed industry, as we have seen for electric-industry restructuring that initiated in the 1990s, may occur in a number of states but not in others.

While a few states, such as California and New York, are preparing for this new world in a dramatic way, most states so far have exhibited more caution. Many questions still remain before we can say with certainty that the electric industry will see a transformation over the next several years. There is no denying that the prospect for big changes is a real possibility. Whether these changes will penetrate the industry in a large way across the majority of states remains to be seen. After all, many who are projecting change either have ideological interests, even bordering on a quasi-religious mission, or monetary interests in promoting such a path. Regulators should therefore not just accept these

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Table 1
Three categories of expected developments in the future U.S. Electric Industry.

Demand-side	Supply-side	Technological developments
Lower sales growth	Increased emphasis on grid resilience	Distributed resources
Greater customer demands for reliability and value added services	Continued increasing average cost	Intermittent renewable energy
More informed customers	Continuously growing DG penetration increasing the complexity of distribution operations	Power storage
Enabling technology for customer decisions	Generation relocation from high voltage to low voltage	Broader application of the smart grid
Broader application of time-varying prices	Increased (reduced) dependence on natural gas (coal) for new generation	Real-time information for market participants (e.g., DG operators, retail customers)
Growing dependency on electricity by digital economy	Increased pressure for clean energy	Plug-in electric vehicles
Customers supply electricity to the grid ("prosumers")		

optimistic[1] or rent-seeking[2] claims for new technologies on face value but act accordingly to a future that may deviate from today's consensus. This measured posture has implications for what actions regulators should take today and in the immediate future versus waiting to see what evolves over the next few years.

For example, should regulators take the lead in proposing changes in utility operations and the business model, and how they regulate? Or should they, instead, wait longer to see what transpires in technology development, and regulatory and energy/environmental policies in other states and at the federal level? What are the costs of staying with the current utility business model and regulatory practices if radical changes occur? At the other extreme, what are the costs of reshaping regulation and the utility business model when we do not see the expected changes happening? Will an explosion in distributed generation, for example, be confined to a few geographical areas or will it permeate most states?

We know from experiences in the 1990s and early 2000s the difficulties of transforming the U.S. electric industry from a highly regulated to a market-driven sector.[3] Compared to other industries that have taken the deregulation route, namely, natural gas, financial services, trucking, railroad, telecommunications, and airlines, the transition to a restructured electric industry has been afflicted with myriad stumbling blocks. For restructured states, a major obstacle rested was the divergent visions that interest groups held about the future direction of the electric industry. There was no solidarity of views about where the industry should be heading. For the other states, restructuring was not even a topic of discussion or stakeholders reached a consensus of "no change." Today's situation is similar in that the dialogue over the utility of the future involves several interest groups with varying views about what path the electric industry should follow. Besides, political and economic conditions make it rational for states to take dissimilar decisions on the future of the electric industry.

2. No guarantee of the future

2.1. Expected developments for the future

Table 1 shows future developments that many experts project for the U.S. electric industry. Many of these developments pose serious financial challenges, or as some would say, opportunities, for utilities. One is that they will lower the utilities' ability to fund increased investments from revenue growth.[4] Customers will also likely impose greater demands on utilities—for example, quicker utility response time to outages. As perhaps the most serious challenge, utilities will face greater competition behind the meter.

The inherent nature of new technologies, which are emerging rapidly on the scene, poses five challenges for utilities:[5] High costs, uncertain costs, uncertain benefits, often minimal short-term benefits, and difficulty in measuring public benefits (e.g., cleaner environment, job creation). For example, benefits to existing customers may be conjectural, or they may not flow directly to the utility's customers.[6] Future benefits may also depend on other developments; as an illustration, customer benefits from the smart grid hinge on new rate structures, smart appliances and active

[1] One area of optimism is that a massive number of residential customers will invest in solar PV systems. It is plausible that only a small minority of households care enough about lowering their electricity bills to spend a large amount of dollars upfront or even allow a third party to make the investment and install a system on their rooftop. After all, the average residential customer spends only about 2.7% of its before-tax income on electricity. (Bureau of Labor Statistics, Annual Expenditure Survey, 2012.) Experiences with retail choice has also shown that the vast majority of residential customers would prefer staying with their current utility rather than switching to a third party even at the lost opportunity to lower their electricity bill.

[2] Some analysts contend that the same condition accounts for both the recent push for distributed generation and support for retail competition in the 1990s, namely, that average cost exceeds marginal cost in both periods, meaning that utility customers benefit from bypassing utility service (priced at average cost) and switching to another source (priced at marginal cost). Because of this pricing discrepancy, it is difficult to know whether bypass improves net economic welfare (i.e., economic efficiency). The effect is cost-shifting between electricity customers, rather than real cost savings. In both instances, lost utility revenues typically pass through to remaining full-requirements customers in the form of increased rates. This contention basically says that customers wanted to avoid utilities' sunk costs by having the right to choose another supplier. The logical remedy is to set utility retail rates based on marginal or incremental cost. See, for example, Borenstein, S., and J. Bushnell. "The U.S. Electricity Industry after 20 Years of Restructuring." EI@Hass WP 252, Sept. 2014.

[3] *See*, for example, Navigant Consulting. "Evolution of the Electric Industry Structure in the U.S. and Resulting Issues." Prepared for the Electric Markets Research Foundation, Oct. 8, 2013; and Joskow, P.L. "Markets for Power in the United States: An Interim Assessment." *The Energy Journal*, vol. 27, No.1 (2006): 1–36.

[4] The reader may correctly argue that over time utilities should invest less because of slower sales growth. While this is true, many of the future utility investments will not stem from sales growth but with energy, environmental and regulatory policies (e.g., grid improvements to accommodate DG, Clean Power Plan).

[5] New technologies include solar, wind, and other renewable energy resources, storage, the smart grid and electric vehicles. Not all of these technologies are economical at this time and will require further technical improvements or changing economic conditions, which may be several years down the road, before they are. Some enjoy large tax subsidies with uncertain futures. The benefit-cost performance of these technologies will also vary by state. In certain states, some of these technologies will fail to pass muster, both politically and economically. The smart grid is an amalgamation of technologies that makes possible remote monitoring, two-way communication, and automatic control of facilities on the transmission and distribution networks. It includes "smart" metering and associated communications capabilities. [see Joskow, P. L. "Creating a Smarter U. S. Electricity Grid." *Journal of Economic Perspectives*, vol. 26, No. 1 (Winter 2012): 29–48.]

[6] Uncertain benefits may require utilities to express them qualitatively rather than numerically. It is unclear how a cost-benefit analysis would consider those benefits in combination with quantifiable benefits in the overall review of a technology.