



Utility of the future: A vision of a two-way street



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ABSTRACT

As modern technology drives us to a new framework involving a two-way exchange of services among customer, utilities and regulators, parties need to re-examine the unit ideas employed in articulating the policy frameworks necessary to address this transition. They need to explore the choices made between customized services and commodity service, tariff and contracts, and cost of service and value of service.

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1. Introduction

“Of all histories the history of ideas is the most difficult and elusive. Unlike things, ideas cannot be handled weighed, and measured. They exert a powerful force in human history, but a force difficult to estimate.”¹

“It is only in transitional situations that it is really true that men learn nothing from history: they cannot.”²

This is an essay on the implication of change for the ideas and particular institutions that constitute modern regulation. As the first quote above notes, the history of ideas can be a slippery subject but their importance to how policy is made is critical. Many ideas become embedded in our culture and we forget to even ask whence they came. In a March 2014 article I examined some of the ideas associated with the transformation taking place to the electric system as the home shifts from being a passive consumer to an active producer/consumer.³ Under this home-as-power-plant scenario, the local electricity system is transformed from a one-way street into a two-way street, where home-as-power-plant becomes the distributed resource par excellence and the distribution company is transformed into a distribution/delivery service provider or operator (DSO).

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¹ John C. Greene Darwin and the Modern World View, Louisiana State University Press, Baton Rouge, (1961) p. 3. Similarly J. M. Keynes noted Practical men who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back, (The General Theory of Employment, Interest and Money, Harcourt, Brace and World, NY., 1936, p. 383.).

² Ernst Geller. Thought and Change, University of Chicago Press Chicago (1964), p.66.

³ Karl McDermott, The Home (as Power Plant) and Its Role in Electric Policy: Past, Present and Future, Electricity Journal, Vol. 27, Issue 2, March 2014.

This transformation represents just the latest stage in the shifting roles caused by a series of technological transformations that have continuously modified the boundaries of the economic network that has made up the evolving electric grid. Various technological innovations have enabled the creation of systems that could supply a factory or a municipality economically to those technologies exploiting economies of scale resulting in system consolidation. Other innovations enabled the interconnection between individual systems to lower the cost of reliability and reserves, promoting further consolidation. The modern developments in communications and computer technologies have allowed us to manage the complex wholesale market transactions within the system of RTOs and ISOs, capitalizing on the capture of arbitrage potential between plants with different marginal costs of operation. Each of these innovations had implications for the nature of the structure of the industry, and the question of where monopoly ended and markets began as well as the structure of the regulatory model.

The current phase of the transformation involves the application of computer and telecommunication innovations to a new level, the level of homes and the distribution grid, enabling homes to directly interact with the electric network in an unprecedented fashion. These technologies simultaneously enable grid modernization that establishes an improved platform over which customers can interact. The transition that is occurring moves us from a world of distribution systems as conduits to distribution systems as platforms, essentially transforming the local company from toll collector to a distribution system operator/manager.

As with any change of this magnitude the industry, its customers and regulators are still grappling with the implication and potential effects that this transformation will have on how we operate and regulate the local utility. Just as we adjusted to the restructuring of the industry in the 1990s, we will have to adapt to these new changes. Some, like Geller quoted above, offered the

view that transitions negate the importance of history; but in the case of electricity, technology seems to swing like a pendulum moving the boundary of monopoly and competition, forcing us to reconsider the operational structure and the form of regulation to apply to each component. When generation technology shifted the boundary of efficient organization from decentralized to centralized stations in the 1920–40s, the industry structure and regulatory policies adapted. In the 1990s, natural-gas-fired turbines redefined that boundary and wholesale generation markets were the result, in many, though not all, parts of the country. We adapted our structure and regulatory focus to accommodate these changes. There are still viable lessons from this history and it is worth exploring what these new innovations may imply for the future structure and regulatory methods going forward.

But history is important, as Justice Holmes once remarked:⁴

... history is the means by which we measure the power which the past has had to govern the present in spite of ourselves, so to speak, by imposing traditions which no longer meet their original end. History sets us free and enables us to make up our minds dispassionately whether the survival which we are enforcing answers any new purpose when it has ceased to answer the old.

Understanding the roots of our institutions and the public purpose that they serve is key to continuing to adjust the objectives, goals, and methods employed. Regulation of public utilities and the nature of the public service rendered must comport with what the public is actually interested in achieving. Re-examining the past purpose of the public utility and regulation can help us decide where changes may be necessary.

But it is not just institutions and technology that are changing and helping to shape our organizational and regulatory technique. Customer attitudes are also changing in response to the environmental debates over global warming and climate change. Customers are becoming more willing to engage in electric and energy decisions. Modern technology is enabling this engagement by simplifying the process of gathering and processing usage and pricing information. The customer can substitute machines and algorithms for the personal time required making the real choice to engage at the point of the single decision to purchase the smart equipment.

The future home will have greater capabilities to sell supply from solar and battery sources including electric vehicles. These changes imply that utilities and customers will forge new relationships as well as modifying industry and regulatory institution that support this new set of relationships. It will need to reflect a transition to a world that no longer favors unbridled usage, but still requires high-quality service to operate an ever growing set of appliances, machines, and technology that are dependent on electricity. The focus of this world will be conservation and efficiency, not through put and load growth.

We cannot overemphasize that the system has not transformed the home or business into a stand-alone supplier; what it has simply achieved is to create a new set of potential resources to meet system supply needs and enabled consumer demand to finally play its proper role in the marketplace. The debate over the utility of the future is really a debate over a new “second” restructuring of the electric industry and how regulation must adapt to the new possibilities. The current revolution is now

enabling an integration of both demand and supply resources on an equal footing, regardless of the market structure.⁵ The utility of the future is placed in the special position of providing the balancing and control functions necessary for the local system to interact with both the overall network and with maintain local reliability. These changes are altering the traditional methods of interaction between customer and utility.

2. Examining our unit ideas and concepts

My earlier article attempted to place the current transition into a historical and philosophical framework examining our unstated preferences and beliefs that conceptualized energy as a passive servant to our needs casting the utility in the role of automatically supplying our ever-growing demands. In support of this explicit and implicit view, our institutions were designed to complement and support those ingrained views of energies role in our society. Regulation, the laws and the Commissions that regulate utilities are examples of those central institutions and the conceptual framework employed can either support the status quo or promote the development of this new market.

In that earlier article I attempted to examine the nature of the hidden concepts and modes of thought that have ruled our past policy behavior. In this article I would like to examine the implications of this transition for some of the unit concepts and fundamental ideas associated with our traditional regulation models and engaged in the process of re-conceptualizing how these ideas will evolve when applied to the new relationships between utilities and customers. Some of the greatest difficulties we face in transitions is knowing what to keep and what to discard. Change or transitions often have negative connotations: we lose something we know and gain something uncertain. But at the same time we don't want to be held prisoner by our traditions and we don't want to cast aside our institutions and principles that are foundational to our gestalt or world view. It is the process of making these choices that shape our future and bring a certain degree of angst to both regulators and industry leaders. So exploring our concepts and the ideas that dominate of views becomes a worthwhile exercise.

Once again I will borrow from Arthur Lovejoy's *Great Chain of Being*,⁶ where he introduced the idea of unit concepts by noting:

... the history of ideas ... is differentiated primarily by the character of the units with which it concerns itself ... In dealing with the history of philosophical doctrines, for example, it cuts into the hard-and-fast individual systems, and, for its own purposes, breaks them up into their component elements, into what may be called their unit-ideas.

In order to understand how our embedded concepts, or “standard” ways of conceptualizing the utility and energy policy problems, arose, we need to explore the nature of our prevailing unit ideas and how these ideas may need to change as we move from a world of one-way streets to two-way streets for electricity. This is not a new or unique exercise, as others such as Robert Nisbet⁷ took Lovejoy's ideas and applied them to sociology in order to re-conceptualize how to recast our understanding the complexities of industrial society. Understanding the unit ideas that we employ in our dialog on energy policy and in particular transitions in energy systems is a key component of good policy. Just

⁴ Oliver W. Holmes, *Law in Science and Science in Law*, Harvard Law Review, Vol. 12, 433, 452 (1899).

⁵ Whether vertically integrated or restructured, the new technologies will slowly transform homes into the source/sink as opposed to simply a sink. States with IRP processes or competitive procurement will both need to consider the value brought to our future distribution systems of a more versatile home.

⁶ Arthur Lovejoy, *The Great Chain of Being*. Harvard University Press 1936, p.3.

⁷ *The Sociological Tradition*, Basic Books, NY (1966).

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