What a Long-Term Rate Strategy Should Address

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Electric rate structures have the potential to evolve and benefit utilities and customers. Advancements in technology have made it possible to recognize and charge customers based on their usage patterns, relay accurate price signals, and design rate structures that reflect the fixed and variable costs of providing electric service.

For many years, electric rate structures remained relatively unchanged, with a simple energy rate, sometimes a customer charge, and a demand charge (for larger customers). Given metering limitations, these rate structures were the most effective way to bill customers. Now, with data from new technologies, utilities have the opportunity to understand their customers in a way they previously could not and recognize areas where utility objectives are not being met.

There are at least three areas in which current rate structures do not achieve utility objectives.

- Price signals sent to customers are often inconsistent with the cost of providing electricity, and customers are offered little incentive to use electricity cost-effectively. For example, incorrect price signals have caused some customers to make uneconomical investments in technologies that shifted costs to other ratepayers.
- Rate structures may fulfill the utility's need for revenue but might not reflect how costs are incurred. Charging customers on the common two-part rate structure — with a customer charge and energy rate — is an example of a rate structure that is inconsistent with cost recovery and cost causation.
- Consistency between rate structures is an important consideration. For example, large general service customers might experience dramatic changes in bills when moving from a small general service rate to a demand-based large general service rate.

Rate-making objectives include fairness to customers, stable revenues for the utility, stable rates for customers, environmental and conservation objectives, and social concerns such as impacts on low-income customers or economic development for the community. Meeting these objectives and confronting industry challenges requires a long-term rate strategy that balances the needs of stakeholders with the objectives of the utility and community. This requires knowledge of rate structures and current rate design strategies.

Time-based rate structures provide an opportunity to achieve environmental objectives and allow customers greater control over their bills, resulting in more stable revenues for the utility.

The Energy Information Administration reported that as of 2016, more than half of the electricity customers in the United States had advanced metering infrastructure or smart meters. AMI gives utilities the opportunity to correct weaknesses in rate structures and balance the interests of all stakeholders. Unfortunately, the need to modify rate structures is not always fully understood because of the complexities of a utility's cost structure.

Since 2014, many utilities have recognized the problems and potential unfairness of outdated rate structures, such as low customer charges, and have developed simpler strategies to correct their rates over several years. Others have taken advantage of AMI to provide customers with rate options such as:

- Traditional two-part rate (customer and energy charges)
- Time-of-use rates
- Time-of-use rates combined with demand charges
- Peak demand charges based on customer usage during peak times of the day

Will multiple rate offerings overly complicate the rate structures, or will they ensure fairness and get all customers to pay their proportionate share for getting electricity into their homes and facilities? Will these rate offerings result in rate structures consistent with the utility's long-term objectives? Answering these questions requires a long-term view that includes input from customers, defining utility objectives, and educating all stakeholders.

Some community-owned systems have taken a long-term view on rates and have developed strategies to correct them. Utilities should identify key utility and community objectives, design rate structures to achieve these objectives, and develop a plan for implementation. Additional steps can be taken to implement rate strategies:

- Help staff and governing body members understand the relationship between customer usage and cost impacts on power supply, transmission, and distribution.
- Assess technologies needed to implement the strategy.
- Discuss how to implement the new rate offerings.
- Identify enabling technologies for customers to respond to the rate structure.
- Assess potential customer impacts.
- Educate customers and market the new rates.

Defining the Utility's Key Objectives

A one-size-fits-all approach does not always apply in our industry, and rate approvals by public service commissions are often not consistent with objectives of public power utilities. Utility rate-making key objectives often consider:

- Fairness to customers
- Social concerns and impacts on low-income customers
- Environmental protections
- Financial stability of the utility
- Stable rates for customers
- Consistent price signals to promote desired investments by customers
- Economic development for the community
- Sending price signals consistent with the utility's costs
- Providing customers greater control over their electric charges
- Providing reliable service to customers

None of these objectives should be considered in isolation, because achieving one objective may conflict with another. For example, several years ago, inclining block rate structures became a popular way to incentivize customers to conserve electricity. This structure resulted in unstable revenues for the utility, rate increases for customers, and price signals inconsistent with the costs of providing electricity.

The inclining block rates shifted fixed cost recovery from the first block of energy to outer blocks. When customers responded to the price signal, they reduced energy in the outer block, where the fixed recovery was placed, and caused the utility to under-recover costs.

Other rate designs, such as TOU rates or demand charges, may have achieved similar conservation more accurately, without affecting revenue stability. However, without proper technology or education, the industry was not able to implement these types of rate structures.

Time-of-use Rates

In some areas of the U.S, the lowest cost of electricity is in the afternoon, as solar production has had an impact on the cost of power supply during previously high-cost periods. In other areas, the lowest cost is at night, when wind production is greatest. Utilities in these areas can promote the installation of electric vehicle charging stations with proper cost-based price signals.

Time-based rate structures provide an opportunity to achieve environmental objectives and allow customers greater control over their bills, resulting in more stable revenues for the utility. These rates have been used in various forms for many years, such as time-based telephone charges in the 1980s and, more recently, Uber and Lyft prices that "surge" when demand for their services is high.

The concept of TOU rates is familiar to consumers, and many understand that costs are greater during peak usage times. Customers might not fully understand why electric costs are greater but know that costs increase. AMI installations have allowed many investor-owned utilities to offer TOU rates for residential and small general service customers. Some examples include optional TOU offerings by Consumers Energy, Detroit Edison, Duke Energy, Southern California Edison, Florida Power & Light, and many others. The trend of offering TOU rates will continue as more utilities install AMI and systems that can offer such rates.

Demand Charges

Capacity in the distribution system located near a customer's premises is sized to handle a customer's peak demand at any time, even if that capacity is used infrequently. When not used, the infrastructure remains in standby mode, waiting for that potential demand. Distribution costs for most residential and small commercial customers are recovered in energy rates. This results in a disassociation between how costs are incurred (peak demand) and how they are billed (energy). When a customer reduces energy consumption but not demands, the distribution costs will not be accurately recovered and the customer will be under-charged. For example, demands created by a customer with a rooftop solar array are often nearly identical to that customer's demand prior to installation of the array (load factor is reduced), and customers implementing energy efficiency tend to reduce both energy usage and demand and improve load factor. Demand charges provide incentives for customers to flatten their usage and possibly install batteries,

and they create additional incentive for customers to take advantage of energy efficiency improvements.

Some utilities offer or require a three-part rate structure (customer, energy, and demand charges) for residential and small general service customers. The transition to demand charges is slow because of concern over a customer's understanding of what a demand charge is, how it's determined, and how it's controlled. Lack of understanding by utility staff increases the barrier to implementation. Successful implementation of demand charges often includes the education of utility staff and customers and a strategy to implement demand charges over time.

Several utilities in Nebraska have implemented mandatory demand charges for residential customers over time. Slow implementation limited the impact on customers and gave everyone time to understand demand charges. This resulted in successful implementation, with limited customer questions and almost no complaints.

Many utilities have implemented demand charges for customers with rooftop solar installations, while other utilities make it part of their rate offerings to residential customers. Demand charges are being considered by many utilities and may become a common rate structure for all customers in the future. Demand charge implementations will potentially occur after adoption of TOU rates, which are often better understood and easier to implement.

Grid Access Charges

Grid access charges are relatively new and used by only a few utilities. These charges attempt to ensure that customers pay for their potential impact on the infrastructure used to provide their electricity. At first glance, the charge resembles an inclining block customer charge, with rates increasing as they move to a higher block. In theory, the charge is designed to recover fixed customer charges and a portion of the capacity costs associated with power supply, transmission, and distribution.

An example of a grid access rate structure is shown below.

In this example, the utility phased in the grid access fee over a period of two years. At the start, all customers were billed a fixed customer charge of $11.83. In the first year, in conjunction with a rate adjustment, an inclining charge based on usage was established. In the second year, the rate for each block was adjusted, and the energy rate was reduced. Initial feedback on grid access charges has been positive, but any utility choosing this structure needs to review potential customer impacts. Often, the determination of a customer's block is based on the customer's peak usage over a 12-month period. Some utilities are considering grid access charges where AMI metering has not been implemented.

Customer Charges	Current Rates	Year One	Year Two
0 – 500 kWh	$11.83	$13.50	$17.32
501 – 2,000 kWh	$11.83	$16.90	$23.63
2001 – 4,000 kWh	$11.83	$16.90	$37.37
Excess kWh	$11.83	$31.40	$64.34
Energy Rate per kWh	**$0.1016**	**$0.1016**	**$0.0916**

Summary

Electric utilities are at different stages of offering more accurate rate structures and are largely dependent on metering investments or the desire to better align rates with fixed and variable costs.

When costs are aligned with rates:

- Customers pay the cost of their service.
- Price signals promote more cost-effective use of electricity.
- Price signals incentivize proper investments and changes in usage patterns.
- Customers are offered options to reduce their electric bills.
- Revenue stability for the utility is improved.
- Utilities are better able to achieve the objectives of the community.

A long-term rate strategy, along with an implementation plan, is needed to meet the evolving challenges of our industry. More accurate rate structures — including TOU rates, real-time pricing for larger customers, and demand charges for all customers — will become more common. The earlier a utility begins the process, the easier the transition to more accurate rate structures.

About the Author

Mark Beauchamp *has more than 38 years of utility experience and is a national expert on rate design. He has completed cost of service and rate studies for more than 300 public power utilities and investor-owned utilities around the U.S. and has served as an expert witness in rate cases.*