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Evan Polymeneas,
Andrew Schwaitzberg
and Humayun Tai

Sticker shock: Why utilities now must rethink customer affordability

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As electricity consumers demand more convenience and flexibility, utilities, regulators, and customers themselves will have to decide which investments to make—and who should pay for them.

Stakeholders in the electricity-utility industry face challenges that have been building for years. As electricity supply and demand evolve, they must rethink the fundamentals of cost allocation, customer value, and rate design.

The decisions they make will have major implications for investments in the grid and utility operations for years to come. They will also have a huge impact on relationships between providers and millions of customers who want more choice, convenience, and control.

Here, we examine the factors driving disruption and issues utility executives should address now. We close with questions that those executives will need to answer for their full set of stakeholders.

Factors forcing change

A host of factors is converging to transform an energy sector that has changed little for the better part of 100 years. Most of the historic increases in electricity consumption associated with population and economic growth have disappeared, thanks to efficiency improvements. Better building standards and technological advances such as LED lighting and building-energy-management systems mean this decoupling is here to stay.

Distributed energy resources such as solar, energy storage, and combined heat and power allow customers to generate and manage electricity themselves and reduce the overall volume and peak demands on the grid (Exhibit 1).

The impact of these trends must be weighed against new electrification demands, such as for electric vehicles, and other emerging electrification trends, such as data-center demand. Many people expect utilities themselves to play a leading role in enabling these demand-reducing

Exhibit 1

Energy efficiency drives a significant portion of the outlook for volume and peak decline.

[1]Includes both macro factors and electrification.

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technologies, accommodating changes in load patterns and grid interactions—even if that means spending more and charging less while taking on more operational responsibilities.

Indeed, as the overall rate base flattens and electricity sources proliferate, the implications for affordability will be far-reaching. For generations, residential rate design has been driven by volumetric demand—kilowatt-hours. For many years, utilities managed an increasing cost base by spreading their costs over a growing demand base. But without demand growth, utilities must now maintain the same large infrastructure base while also modernizing to meet the demands of customers and regulators alike.

The infrastructure issue looms large. Across the country, the grid is desperate for reinvestment to maintain physical and digital safety and security, and to improve reliability and resilience. In many cases, enhancements are needed to enable new distributed technologies. More utilities and regulators are investigating nonwire alternatives to mitigate the need for large capital investments and modernizing the grid. Progress will require a greater ability to manage and control distributed resources and a fundamental rethinking of the traditional utility earnings model.

The challenges do not end there. New rate designs and cost allocations across the customer base will create affordability pressures. For example, the early adopters of solar and other new technologies are likely to be those who can afford the up-front costs; if they pay a smaller share of the costs required to maintain the grid, more of the burden will shift to the rest of the cost base. The smart grid investments required to enable and enhance the new customer value associated with new technologies would typically be socialized across the entire customer base, leaving low-income consumers especially vulnerable to higher rates and larger electricity bills.

Revised priorities for industry leaders

Given that the electric grid is designed to handle peak demands, utility executives and regulators need a deeper understanding of the overall system-cost picture: much more nuanced views of both overall volume and peak demand.

We believe utilities must quickly gain a deeper understanding of demand in their service territories—not only a detailed knowledge of the system-level picture but also a dynamic view of hourly demand at the individual circuit level. With this granular view of demand, utilities and regulators will have to answer a range of important questions:

- What is the overall health of the system? Where will the utility need to invest to mitigate the risks of obsolescence and equipment failure, including replacing rotting poles and storm hardening and preparation?
- Where will new investments be needed to accommodate economic and population growth? What are the right solutions for that purpose, from new substations to nonwire alternatives?
- Where is infrastructure inadequate to accommodate or encourage the adoption of new distributed technologies such as solar, storage, and electric vehicles, such as the need for smart inverters?
- Where else do utilities need to invest to align consumer incentives and behaviors, such as with price-signaling capabilities?

The looming rate debate

Once utilities and regulators identify overall cost needs and revenue requirements, they will need to consider the looming questions around earnings and cost allocation. In the United States, customers' energy shares of wallet can vary widely, with some geographies already feeling the burden of high energy costs.

Given these pressures, the return-on-equity construct will need significant adjustments. Across the country and around the world, new outcome- and performance-based rate-

making principles are emerging. For example, the RIIO framework (Revenue = Incentives + Innovation + Outputs) in the United Kingdom shifts the focus from cost recovery to delivery of specific outputs, such as innovation, customer satisfaction, and safety. Italy is setting up a "total expenditure" framework, along with incentives and output-based earnings opportunities. Frameworks such as these will be necessary to align incentives for least-cost solutions, and to reward innovation and execution.

Utilities and regulators can consider designing rates around several levers: the volume needed, demand during utility-system peak, customer peak needs, and the fixed costs associated with a connection. Increasingly sophisticated rates that consider both time of use and location can better reflect cost and value; customers will likely push back—especially those whose usage is low but now face fixed connection charges. Others may object to more complicated bills. Moving away from the volumetric rates many also reduce their incentives to conserve energy, potentially leading to environmental impacts. The balance of fixed demand and variable charges can significantly influence the economic viability of distributed technologies, such as solar and storage.

Questions of cost allocation and fairness will cause substantial debate and require utilities to communicate clearly with customers, regulators, and other stakeholders. In a world where utility-revenue requirements are flat but demand is declining, the average customer would see a headline-rate increase but no change in her overall transmission and distribution (T&D) bill, despite improved efficiency. The "average customer" is rare, however—bills will vary widely.

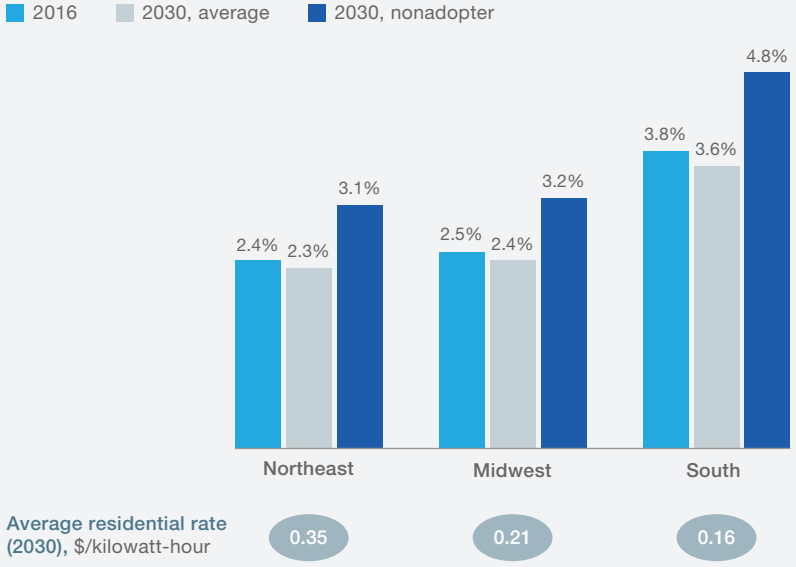
Utilities and regulators will need to work together develop a holistic, integrated approach to rate making that addresses numerous new challenges:

- Who should pay for grid modernization, without which some customers will not be able to adopt new technologies?
- What role should the utility play in protecting low-income consumers and "late adopters" from unreasonably high bill increases?
- How should increasingly sophisticated cost-allocation mechanisms, such as time-of-use billing and demand charges, be incorporated to incentivize customers? How would such moves be balanced with simplicity and ease of understanding?
- How can customers' unique energy needs be met more effectively, either through bundling or unbundling of the electric bill?

Some of these debates are starting to play out across the country, and it is already evident that the trade-offs are complex. For example, if a utility moves away from net metering for solar, customers would have incentives to consume more of their solar generation on-site and therefore improve storage economics. All of those potential changes must be weighed against

Exhibit 2

The electricity share of wallet for low-income customers ranges across regions in the United States.



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the formidable challenges of communicating significant and probably complicated changes to a broad set of customers.

As seen in Exhibit 2, the impact of these trends will not be uniform across different customer segments and different geographies. For example, while rates may be higher in the Northeast of the United States, the share of wallet for a low-income customer is lower than in the South due to the lower overall electricity demands. Based on our overall view of trends in costs, the current regulatory construct will create clear winners and losers—a situation that will require careful consideration by the utility, regulators, and customers.

A collaborative future

Even though underlying demand for electricity is not growing, the benefits it enables—temperature control, information, communications, and convenience—are ever more critical. To bridge this gap, we believe regulators, utilities, and consumer advocates will need to collaborate closely in several areas:

- capturing the value of benefits and contributing their fair share of the value of the grid
- assuring the affordability of rates and total bills
- considering alternative billing determinants and structures, focusing keenly on the implications for cost allocation across customer segments
- considering the value of the grid in the continuous provision of electricity, and accommodating new energy sources that provide customers with choices

A handful of utility companies are acting now on the new imperatives. We expect that they will build competitive advantages, including brand power that will help them attract customers, talent, and investment. Many other companies will continue with business as usual even as the pace of change accelerates.

Evan Polymeneas is a consultant in McKinsey's Atlanta office, **Andrew Schwaitzberg** is an associate partner in the Houston office, and **Humayun Tai** is a senior partner in the New York office.