FORGING A PATH TO THE MODERN GRID

ENERGY-EFFICIENT OPPORTUNITIES IN UTILITY RATE DESIGN

ALLIANCE TO SAVE ENERGY
using less. doing more.

Rate Design Initiative

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ACKNOWLEDGEMENTS

This document is a product solely of the Alliance to Save Energy. The Alliance is a bipartisan coalition of government, industry, academia and civil society interests working together to improve energy productivity to strengthen and expand economies, improve the environment and enhance energy reliability and security.

The following white paper, while solely a product of the Alliance, was deeply informed by the core participants of our Rate Design Initiative. We are grateful for the valuable resources, contributions and insights of the 30+ organizations and individuals that shaped this report, including a wide variety of advocacy organizations, industry associations, technology companies, think tanks, regional partnerships and utilities. It is important to note that, among these stakeholders, there is a considerable divergence of opinion regarding the path forward for utility design.

Further, the recommendations in this report are not intended to prescribe any specific policy, but merely to inform policy decisions. As such, they are not intended for use in specific rate cases.

Finally, thanks go as well to the many Alliance team members, past and present, whose work underpins this important, proposed new way forward on rate design, which we believe will encourage demand side efficiency and system energy efficiency alike, to the benefit of all stakeholders.

KATERI CALLAHAN

President

Alliance to Save Energy

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EXECUTIVE SUMMARY

The past decade has seen a convergence of technology, policy and economic trends that have directly impacted the energy sector. New appliance standards and building codes have reduced the amount of energy we use. New communications and information technology have transformed electricity delivery and use from the analog world to the digital world. Prices for renewable generation have fallen; for example, solar PV prices have fallen by more than 60% since 2010,[1] and the cost of wind projects have fallen by more than 90% since the early 1980's.[2] As a result, electricity sales for the U.S. utility industry have been flat for years and the carbon intensity of the power grid fell by 21% between 2005 and 2015.

Through it all, utility companies have been working to maintain safe, reliable and affordable service. But the way utilities have traditionally recovered much of their costs – through flat volumetric pricing (cent per kilowatt-hour), especially for residential and small commercial customers – is increasingly out of step with the needs of both the utility companies and the customer base they serve. As efficiency and distributed generation continue to put downward pressure on sales and in the absence of frequent rate increases, reliance on traditional, flat volumetric pricing makes it increasingly difficult for utilities to recover the fixed costs of existing assets and new investments needed for replacing aging infrastructure.

Fortunately, the same technology and policy trends that are driving this misalignment can be called upon to help solve the problem. The Alliance believes that the transition to a grid that is reliable, resilient, decarbonized, automated, transactive, efficient and equity-driven (hereinafter referred to as a "modern grid") can be enabled through good rate design.

Appropriate combinations of rate designs and other ratemaking policies can support an increasingly clean energy system without detriment to reliability, exorbitant costs to consumers or degradation of utilities' financial stability. Other benefits could emerge as well. System utilization would increase as customers manage their peak demand and provide headroom to bring on additional electrification of end uses. Price signals can more closely correspond to system costs, providing the correct incentives about what to deploy and where to deploy it. Customer rates can be managed due to an increase in energy supplies with zero fuel costs. And tying it all together will be the utility, coordinating the many pieces of technology that are plugged into its grid.

There are a number of elements that will be important for attaining this vision, however: demand flexibility will be critical; cost-effective energy efficiency must be aggressively deployed everywhere; and zero- and low-carbon generation must play a part in both the bulk power grid and the local distribution grid. The ability to manage customer loads through demand-side management will be critical to balancing supply with load. Energy storage (both thermal and electrochemical) will play multiple roles, including maintaining power quality on the system. Also, products, services and markets must be developed and commercialized to coordinate everything, policies must be in place to shape the move toward a modern grid and rate design must support all these activities.

Energy efficiency will continue to be a critical means to reduce the need for electricity generation. But we expect that to some degree in the future, the nature of achieving efficiency will change so that it focuses on not only ***how much*** electricity is used, but also ***when and where*** it is used. To ensure that this transition happens in a way that optimizes the deployment of all types of system resources, prices that recognize the possibility of bi-directional price signals, power flows and geographic and temporal costs are increasingly important.

It is within this context that the Alliance to Save Energy (Alliance) convened the Rate Design Initiative (RDI), with input from a diverse set of rate design stakeholders, to develop principles and recommendations for rate design that can serve as a near-term guide for policymakers and regulators to help align their decisions with policy goals as they examine these complex issues in their own jurisdictions.

All parties participating in the Alliance's discussions fully acknowledge that a singular proposal will not apply to all markets. However, the core participants did reach consensus on a set of principles designed to drive future innovation in Demand Side Management (DSM) services and business models in response to changing customer needs and the evolution of distributed energy management, generation, storage and control technology. These are:

- Rate designs should include the ability to collect for the use of the energy grid and to compensate customers for investments that provide verifiable local and system-wide cost savings compared to alternatives.
- Rates should be designed, to the extent possible, to reflect the real-time, localized costs of service while assuring equity, limiting complexity and minimizing rate shock.
- Rates that more accurately reflect the costs and savings resulting from time- and location-dependent demand management should be introduced as a platform for delivering innovative new energy services to customers.
- Utility business models should be complementary with state energy goals and priorities.

Based upon the principles developed with full consensus of the core RDI participants and consistent with its mission, the Alliance has set forth proposed elements to consider for a transitional rate design for those utility systems with advanced metering infrastructure (AMI) and for those without it.

It is critical to note, however, that **this white paper was not prepared with specific ratemaking or regulatory proceedings in mind; it should not be cited by any party in a specific ratemaking or regulatory proceeding as evidence that the Alliance endorses any specific proposal.**

Although many commercial and industrial customers today are served today by three-part tariffs, which include a customer charge, a demand (or kW) charge and a volumetric (or kWh usage) charge, the majority of residential and small commercial (collectively, mass-market) customers are served on traditional two-part tariffs comprised of customer and flat volumetric charges. The consensus of the RDI core participants is that the latter rate design will not assist us in transitioning to the modern grid that will benefit all customers in the future.

Revenue decoupling is an important policy in many jurisdictions for many reasons, but the RDI participants stressed that it is insufficient to accomplish the needed transition and should not be viewed as a substitute for good rate design. At its core, revenue decoupling breaks the link between utility sales and revenue. By adjusting rates up or down depending on actual sales, decoupling ensures that the proper revenue will be recovered by utilities. In the short term, this can protect consumers from over-recovery if there is a hot summer and can protect utilities against under-recovery if energy efficiency programs are more effective than anticipated. The Alliance concludes on this issue that if rate design better aligns costs with prices, it will be complementary to the choice of decoupling as a policy tool.

This report provides tools to stakeholders at the start of the journey to a modern grid; extensive analysis, pilot programming and stakeholder outreach and education will be necessary to complete it.

Alliance to Save Energy Points for Consideration

Utilities will begin the journey to a modern grid from different starting positions and with different factors that control the pace and character of the transition. Some states already have in place technology (such as AMI) and policies (such as revenue decoupling) that will enable this transition to occur more quickly than others. Some states may have laws or regulations that must be considered in concert with changes to rate design. In all cases, utilities must be responsive to the concerns of their stakeholders and the precedents of rate-setting bodies.

Within this document, the Alliance provides a starting point for parties considering a new rate design, including elements of a *transitional rate design* that will encourage customers to manage their demand, including through both energy efficiency and demand response, while allowing utilities the opportunity to earn the revenues required for maintaining a safe, reliable, affordable, clean and sustainable grid. To do this, there must be a balance between encouraging demand-side efficiency and system energy efficiency, to the benefit of all. Key considerations include:

1. **The Alliance maintains that the development and implementation of any specific policy must be rigorously analyzed and tested against the "North Star" objective of maximizing system energy efficiency and reaping societal benefits, including minimizing greenhouse gas emissions and maintaining affordable energy access for all.**

2. **The Alliance recommends that as a utility and its stakeholders consider whether and how to pursue a more advanced rate design, analyses and pilot programs should be conducted to gain real-world experience on how customers respond to rate design changes.** These pilots should also test the effectiveness of different enabling technologies such as home automation systems. To the extent that this process demonstrates that the rate designs indeed prompt shifts in energy use and do not disproportionally impact subclasses of customers (such as low-income customers or urban apartment residents), the results can be used to design a rate structure that combines the most effective elements.

3. **The Alliance recommends that aggressive customer-education programs precede the deployment and roll-out of new rate designs.** Such programs are a key and critical element to ensure that customers understand how best to manage their usage under a new rate structure before the new rates are implemented system-wide.

4. **For jurisdictions that do not have AMI, the Alliance proposes a rate structure that incorporates a customer charge plus a seasonal Time of Use (TOU) rate (with cent/kWh charges that vary by season of the year).** In the absence of real-time metering capability, this rate structure represents a sound balance among numerous goals: encouraging demand-side energy efficiency, economic efficiency and system energy efficiency, sending price signals to customers about the cost of service and providing revenue sufficiency for utilities. For those utility systems without the technical capability to implement more granular pricing, tiered rates with seasonal variation in pricing are superior to flat volumetric rates in two ways: (1) these rates more accurately assign capacity-

related costs to the time of year when those costs are incurred; and (2) they link total energy use to peak demand, more accurately assigning peak demand costs to customers likely to be using the system during peak times.

5. **Where AMI is fully deployed, the Alliance recommends implementing three-part rate pilot programs, and if these are successful, the full consideration of a modified, three-part rate structure as a means of transitioning to the modern grid.** All customers, including residential and small commercial customers, could have a customer charge, a demand charge and a volumetric charge. The customer charge would collect revenues for customer-related costs. The demand charge would be based on clear and demonstrable evidence of cost causation and designed to create incentives for customers to both use the grid as efficiently as possible and to shift usage from high-cost to low-cost periods, thus lowering overall system supply and delivery costs and improving overall system energy efficiency. The volumetric charge would be a time-of-use rate with kWh charges varying during three time periods per day.

   The Alliance believes that such a rate design could be constructed to:

   - continue to provide consumers with the incentives and ability to control their energy costs;
   - increase economic efficiency and system energy efficiency;
   - send appropriate price signals to the market for demand-side management investments;
   - help customers participate in improving the efficiency of the system as a whole, delaying or avoiding altogether the need for costly incremental infrastructure investments; and
   - enable utilities the opportunity to earn a reasonable rate of return on their assets.

In this white paper, the Alliance to Save Energy offers suggestions on how states, utilities and other stakeholders could move forward to modify and transition rate designs for mass-market customers to make progress toward a modern grid. We believe that the sooner we begin down this road, the smoother the transition will be.

END NOTES

1 Solar Energy Industries Association. n.d. "Solar Industry Data." http://www.seia.org/research-resources/solar-industry-data

2 American Wind Energy Association. n.d. "The Cost of Wind Energy in the U.S." http://www.awea.org/Resources/Content.aspx?ItemNumber=5547

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