The Electricity Journal 31 (2018) 9–13

Contents lists available at ScienceDirect

The Electricity Journal

journal homepage: www.elsevier.com/locate/tej

Revisiting Bonbright's principles of public utility rates in a DER world

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ARTICLE INFO

Keywords:
Bonbright
Utility rates
Rate making
Distributed energy resources
DER
Electric utility regulation

ABSTRACT

Professor James Bonbright's *Principles of Public Utility Rates*, first published in 1961, was built around a model of vertically integrated electricity monopolies and approached ratemaking largely as an exercise in balancing the interests of capital attraction with those of ratepayers, all within a 'public interest' framework. This article seeds a new conversation about changes to the venerable Bonbright principles and introduces new principles of public utility rates for an era of electric utility transformation.

1. Introduction

When James Bonbright's "Principles of Public Utility Rates"[1] was published in 1961, electric utilities and the environment in which they operated were vastly different. The central station utility model was dominant, and economies of plant scale appeared inexhaustible. In fact, the 1960s marked the zenith of the trend toward large power plants,[2] and since that decade, we have seen a wide range of fundamental changes in the electricity system. These changes include widespread competition in the generation sector, retail competition, the emergence of renewable energy generation, and, most significantly, a revolution in scale that has ushered in an era of distributed energy resources (DER).[3] Bonbright's text did not account for these changes; now, nearly 60 years since the publication of the Bonbright's treatise, it is time for a rewrite.[4]

Rewriting such a profoundly influential treatise is beyond the scope of this article. Indeed, such a project would be worthy of an extended sabbatical and a genius grant's worth of funding. With all due respect for the enormity of that effort, and with keen appreciation of the authors' limited resources, we can nevertheless briefly introduce some of the important revisions and additions to Bonbright's principles that today's utility sector conditions compel.

2. Drivers of change

In 2002, Rocky Mountain Institute published *Small Is Profitable,* presaging today's rapidly expanding markets for DER technologies and services.[5] More importantly, *Small Is Profitable* also foresaw the potential sector impacts:

> *These "distributed resources" could displace new bulk power generation, bulk power trade, and even much transmission as new technologies, market forces, institutional structures, analytic methods, and societal preferences propel a rapid shift to "distributed utilities," operating on a scale more comparable to that of individual customers and their end-use needs.*[6]

Small Is Profitable identified 12 key drivers of change, still powerful

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[1] Bonbright (1961), "*Principles of Public Utility Rates*," Columbia University Press (1st ed., 1961), available at http://www.raponline.org/ document/download/id/813.

[2] In fact, the economics of large central station generation were waning already with Bonbright's book was published. *See* A. Lovins (2002) *"Small Is Profitable*," Rocky Mountain Institute (2002), available at https://www.rmi.org/insights/knowledge-center/small-is-profitable/.

[3] This article uses the broadest definition of "distributed energy resources," to include generation, efficiency, energy management, storage, electric vehicles, and other technologies and services interconnected and operated as resources at the distribution edge of the electric system.

[4] A second edition was published in 1988, three years after Bonbright's death, and was authored by Albert L. Danielsen and David R. Kamerschen. This article references only the original first edition.

[5] *Small Is Profitable,* at § 1.2.1.

[6] *Id.* The full list of drivers included: more efficient end use; small-scale fueled cogeneration; cheap kilowatt-scale fuel cells; new fuels; cheap, easy-to-use renewable sources; distributed electric storage; grid improvements; distributed information; distributed benefits; competition; shifts in electricity providers' mission, structure, and culture; and unbundled service attributes.

https://doi.org/10.1016/j.tej.2018.09.004

Available online 28 October 2018

and defining today. These included energy efficiency and distributed generation, distributed storage and cogeneration, business model changes and competition, and data. New technologies and evolving consumer attitudes continue to drive transformation of the traditional utility business model into a new, more transactive, competitive, and customer-responsive marketplace. As customers increasingly seek to generate their own electricity through on-site generation, reduce their load through energy efficiency, and otherwise take more control over their energy usage and bills, utilities are facing challenges unimagined or at least not fully appreciated when Bonbright articulated principles for public utility ratemaking.

In response to low or negative sales growth, many utilities have increasingly pushed for rate designs that feature higher non-bypassable customer charges to increase the certainty of revenue recovery (and weaken the incentive for efficiency and self-generation), demand charges intended to generate the revenue to pay for infrastructure and grid modernization investments, access charges and reduced compensation rates for customer-generators to address alleged cost shifts and lost revenues,[7] and standby fees that increase charges for self-generators who interact with the grid less frequently than customer-generators.

Other shifts are also contributing to the changing electric utility landscape, including changing priorities in the broad concept of the "public interest." These shifts include the growth of third-party markets for products and services that in Bonbright's day would have traditionally rested with the utility as a monopoly provider; the increased recognition of and commitment to address the opportunities and challenges associated with ensuring that low- and moderate-income customers have equitable access to sustainable energy; state renewables and climate change goals; and a now decades-old efforts to value and incorporate into prices and costs the economic externalities of the electricity sector associated with generation, transfer, and use.

In a few jurisdictions, regulators are working with utilities and market participants to develop rates and pricing strategies designed to better align with public policy objectives. Often these efforts are seen as progenitors to a transition to performance-based revenue models and a new platform-provider role for electric distribution utilities.

Public utility rates are hardly the only tool at the disposal of regulators and policymakers for securing the benefits of access to reliable, affordable, and clean electric service. Indeed, they are not even the best tool in all circumstances. But electric rates are a vital tool, and if poorly designed and implemented, they can be a significant and pernicious obstacle to meeting public policy objectives. The purpose of this article is to continue and advance a decades-old discussion and exploration of how to design and implement electric utility rates so as to protect and serve the public interest inherent in those rates.

3. New principles for the DER era

Bonbright's Principles of Public Utility Rates are often summarized as three: (1) revenue requirement, (2) fair apportionment of costs among customers, and (3) optimal efficiency. These principles have generally been read as focusing on the *utility's* revenue requirement, fair apportionment of costs among customer *classes*, and optimal efficiency in consumption of electricity as a *commodity*. In addition, Bonbright instructed that rates must be simple, understandable, acceptable, free from controversy in interpretation, stable, and non-discriminatory. Today, utilities are not the only investors with skin in the electric service game; customers classes are becoming more diverse, not less so; and the tools and metrics of economic efficiency require attention to far more factors than the price revealed by a century-old approach to cost-of-service accounting. There is important work to do in ensuring that public utility rates serve and support the public interest.

Responsibility for addressing these issues rests with regulators. As one commentator succinctly summed up the raison d'être for regulation of utilities and their rates, "[r]eal competition disciplines performance so that sellers' self-interest is aligned with customers' needs. Monopolists don't face competition, so the missing discipline is provided by regulation."[8] Where there are no plans to increase the operation of market forces in the electricity sector, the primary responsibility of regulators is to ensure that the utilities do not use rate design as a vehicle for abusing their monopoly power and extracting monopoly rents. Where the state policy favors the introduction of competitive market forces into the utility landscape, the regulator must also ensure that utilities do not use their relative market power to discriminate against competitors—today that especially means DER services and technologies. That is because DER services and products increasingly offer superior value in serving customers' needs and advancing the public interest.

DERs have changed the electricity landscape, and should change the regulatory approach to setting rates. A walk through Bonbright's principles in this new era illustrates the need for change. Customers, in their own right and through non-utility parties, are making their own investments in electric service provision—they have their own "revenue requirements." Services are no longer only provided by the electric utility, so the scope of inquiry regarding economic efficiency must countenance a much broader review of costs and benefits, over both the short and long run.

Utilities still largely enjoy state action antitrust immunity, but the underlying comprehensive regulation of utilities by state regulators has, in many places, given way to competitive market structures, raising the very real fairness concern that rate design can be used as an anti-competitive tool against emergent competitors and customer-generators. So, regulatory review of rates should include scrutiny of anti-competitive effects. Similarly, just as PURPA[9] forbids discrimination against small power producers, rate design should not be used to advance undue discrimination. This principle should relate not just to class rates, but also to rates impacting subsets of traditional customer classes—customer-generators, and owners, operators, and providers of other DER.

As policy continues to advance the use of market forces in the electricity services sector, revenue stability for traditional utility and emerging platform functions must be balanced with increased utility exposure to markets and performance standards. Customers are increasingly presented with the opportunity to take service under more dynamic and innovative rates, raising important concerns about the necessary prerequisites for exposing customers to such rates, including comprehensive assessment of the relative costs and benefits of utility service and non-utility options, and in terms of rate design, data access, opt-out provisions, tools to understand and manage use of services, safe harbors, grandfathering, and other features. Finally, the concept of discouraging wasteful use of electricity has heightened importance in a world facing huge environmental challenges, such as global climate change. Full assessment of costs and benefits and of the costs avoided through use of or reliance on DER for the provision of electric service is absolutely essential.

Revisiting Bonbright's principles necessitates both revisiting the manner in which still-relevant principles must be updated for today's realities, as well as the articulation of new principles. A start to the effort means addressing the most important issues that DERs and increasing sector competition bring to the industry. Candidate new

[7] Rábago (2016), *"The Net Metering Riddle,"* ElectricityPolicy.com (Apr. 2016), available at: http://peccpublication.pace.edu/publications/net-metering-riddle.

[8] Hempling (2018), *Regulatory Candor: Do We Own Up?,"* (Jul. 18, 2018), available at: http://www.scotthemplinglaw.com/essays/regulatory-candor-do-we-own-up.

[9] 18 C.F.R § 292.304 (2018).

principles appear in the following discussion.

3.1. Regulators should fully comprehend and reflect resource value in rates

John Dos Passos once said that "[a]pathy is one of the characteristic responses of any living organism when it is subjected to stimuli too intense or too complicated to cope with. The cure for apathy is comprehension."[10] Regulation is complex, even more so in an era of DER and increasingly competitive markets. Rates are often based on historical costs, but have their most profound impact on future behaviors and costs. The growing menu of cost-effective DER-based services and increasing customer choice compels an analysis and explicit reflection of costs, avoided costs, and benefits in basic service and optional rates because of their impact on DER utilization. Regulators can easily recognize that there are significant and challenging gaps between costs, prices, and value in the electricity sector. The cure for reconciling these differences is not regulatory apathy but conscious engagement with objective, data-driven valuation processes.

3.2. Rate making must account for the relative market positions of various market actors, and for the information asymmetries among different customers, utilities, and market participants

The communication of price signals is often touted as the primary, and often only, justification for rate designs that increase fixed customer charges, impose charges on self-generators, or impose demand charges on small customers. Too often, sending price signals to customers about utility cost structure is the only criteria applied to such rate changes. The notion is that utilities have always been high-fixed-cost businesses, but are even more so today. And so, the argument applies a distorted version of the principle that "rate design should reflect cost causation."

The twisted and increasingly common version of the original principle is that "increasing fixed costs should be reflected in increasing fixed charges," with the implication that this will improve economic efficiency.[11] The formulation has the appeal of syntactical alliteration, but this hardly qualifies the proposition as a principle of economics. Indeed, the authors can find no principled economic basis or practical market evidence to support the proposition that fixed costs dictate fixed charges.[12] Moreover, the concept of communicating the utility's cost structure as a price signal ignores the very real price signals that these approaches send to the utility, to the relative information position and choice options of diverse customer types, and to markets for DER. Immunizing a utility's fixed cost investments from the consequences of customer behavior is a recipe for gold-plating, and for the extraction of monopoly rents from customers without the tools and resources to cost-effectively respond to the new rate design.

3.3. Sound rate design must be grounded in a careful assessment of practical economic impacts on all market participants, especially customers

Well-designed and well-understood rates can be an effective tool in encouraging changes in customer behavior and investments over both the short and the long term. But customer charges and access charges for distributed generation, for example, can establish a monthly minimum bill that customers cannot save their way out of, no matter how efficient their use or how much they invest their private capital in generation for self-consumption. Increased customer charges can weaken the economic signal supporting two market segments that are recognized as priorities in many states—efficient use and local generation.

Rate design is often a zero-sum game once revenue requirements are determined and costs are functionalized, classified, and allocated. Fixing or imposing effectively non-bypassable charges therefore reduces volumetric charges and weakens the incentive and value of efficiency and self-generation. Imposing demand-based charges, whether directly through demand charges or indirectly through time-variant charges, on customers who have no practical, meaningful opportunity to respond to those charges turns the theory of "price signals" into the regulatory equivalent of telling customers that if they can't afford electricity during peak periods, they can just "eat cake."

This bundle of issues, related to the recent explosion of rate design innovations proposed across the country, merits another new rate-making principle: No new rate design should be imposed on customers in the absence of that customer enjoying a meaningful opportunity to respond to the rate through modification of behavior or affordable investment in technologies or services. (Caveat: Going without electric service—privation—is seldom a meaningful option). Call it the principle of economic symmetry in rates, perhaps, but it is vital in an era of rate design experimentation and the growth of DER markets and services. Customers must have the education, experience, resources, and options to respond to new rates. Else, the rate is just a tool for the extraction of monopoly rents.[13]

3.4. Rates must support capital attraction for all resources that provide energy services, regardless of whether the affected investor is the utility, the customer, or a third-party provider

Buying or leasing a rooftop solar system, replacing a roof or an HVAC system, weatherizing a home, or just changing a lightbulb all reflect investments by the customer, the landlord, or the DER service provider. Mobilizing capital investments by non-utility parties reduces the cost of service for utility customers, supports market innovation, and diversifies the capital risk associated with the provision of electric services of all kinds. Successful growth in DER markets can reduce the overall societal costs of obtaining reliable electric service. For these reasons, regulators must increasingly account for the impact that electric rates have on capital attraction and project financeability for non-utility DER service and technology providers, and for customers who make direct investments themselves.

[10] Dos Passos (1950) "The Prospect Before Us,". Thanks to Scott Hempling for the reminder of this great quote.

[11] The assertion that it is more efficient to recover fixed costs through fixed charges has been used as a justification for minimum-system approaches to cost classification, recovering demand-related costs through customer charges or increases to customer charges, residential demand charges, and reductions in volumetric energy charges, usually justified only with incantation of some version of the phrase: "Fixed costs should be reflected in fixed charges."

[12] The logical extension of this proposition would be cover charges at coffee shops, cable TV pricing for electric service, and monthly charges for hotels, airlines, railroads, and toll roads, regardless of use. One particularly dogmatic economist once asserted to author Rábago that the proposition that high fixed charges advance economic efficiency is supported by the approach known as Ramsey-Boiteux pricing, a second-best approach in which costs are allocated to customers in inverse proportion to the demand elasticity demonstrated by the customer class. Aside from the fact that regulators largely rejected the broad application of the method because of the fairness and policy impacts when it was originally used to argue for allocating the burdens of expensive power plant investments to residential customers, the concept of Ramsey-Boiteux pricing has no place in a world where regulation seeks to increase competitive choice in all market segments. The idea now belongs squarely on the dust heap of regulation.

[13] A simple thought experiment makes the case: Imagine a customer of modest income, living in a rental apartment and holding down two jobs, one that ends at 5:00 pm, and a second that starts at 7:00 pm. If the system peaks at 5:00 pm, a coincident-peak demand charge or time-of-use rate will hit that customer just as they come home to do the dishes and the laundry, bathe the children, and cook the dinner. What are the practical, affordable options for reducing demand or on-peak use for such a customer?

3.5. Rates must be designed to account for the incentives they create for utilities, customers, and non-utility market participants

Just as "all regulation is incentive regulation,"[14] all rate design is incentive rate design. Regulators must resist indifference to the reality of changing electricity service markets and their influence on the relative positions of utilities, customers, and third-party service providers. As explained above, high customer charges reduce the incentive to pursue energy efficiency or distributed generation and the attendant paybacks for customers, and weaken the financeability of products offered by non-utility service and technology providers. High fixed charges and straight fixed variable rates also reduce the incentive for utilities to find or support third-party alternatives to utility self-build investment options.

3.6. Just and reasonable rates require accurate accounting for utility costs

Ratemaking is the transformation of costs into charges. Unfortunately, cost-of-service studies often rely upon outdated and inaccurate rules of thumb in classifying costs. These classified costs are often directly translated into rate design. For example, under FERC's Uniform System of Accounts, Account 370, entitled "Meters," is used to "include the cost of installed meters or devices and appurtenances thereto, for use in measuring the electricity delivered to its users."[15] In Bonbright's era, all that a meter could do was measure electricity use, and one was required for each customer. It is not surprising, then, that utility cost-of-service studies routinely classify all Account 370 costs as "customer costs," and that these costs are routinely allocated to the fixed monthly customer charge. Putting meter costs in the customer charge is the end result of straight fixed variable rates, the basic customer method, and minimum system methods. But today's meters are not Bonbright's meters. New advanced meter functionality (AMF) meters not only measure consumption like yesterday's spinning-disk analog meters, but they are also a key component of integrating distributed generation, logging demand response, and generating data to support dynamic rates and other services. These meters house data logs and telemetry functions, and are an element of increasingly complex networks of monitoring, signaling, and control systems embedded in the distribution system. With all this change in what used to be the simple task of measuring consumption, it seems plain error to treat all meter-related costs as a customer cost, much less recover these costs through customer charges.

The economically efficient integration of DER services and technologies on an increasingly widespread basis opens the door for many ratemaking innovations, especially for regulators seeking to maximize the benefits and reduce the costs associated with increased market penetration of DERs, whether the hardware and customer interface is owned by the utility, its customers, or non-utility market players.[16] New cost categories are appropriate for energy efficiency-related cost, demand response functionality, and integration costs associated with distributed generation, distributed storage, and electric vehicles. Regulators should work with utilities and other market stakeholders in developing more granular functionalization regimes for electric service costs, in order to support the development of more precise cost accounting structures, and ultimately, more accurate and effective rates.

[14] Lazar (2016), *"Electricity Regulation in the U.S.,"* Regulatory Assistance Project (Jun. 2016), available at: https://www.raponline.org/knowledge-center/electricity-regulation-in-the-us-a-guide-2/.

[15] 18 C.F.R. Part 101 (2013).

[16] *See, e.g.,* Hawaii Revised Stat. § 269-6(d)(4), requiring the Hawaii PUC to consider a shared cost savings incentive, a renewable energy curtailment mitigation mechanism, a stranded cost recovery mechanism, and the establishment of differentiated authorized rates of return on common equity to encourage particular kinds of utility investments.

3.7. Rate design and cost allocation are separate functions, driven by distinct policy objectives

As previously discussed, the common practice of recovering customer costs through customer charges has alliterative appeal, but does not honor economic policy or necessarily best serve the public interest. Once costs are labeled, however they are labeled, the process of designing rates should not be dictated by mere accounting convention. Treating accounting labels as determinants of rate design serves to encourage the pernicious practice of contorting customer cost definitions in an effort to increase customer charges. The minimum system method stands as an example of the kind of poor policy that remains today, in spite of Bonbright's specific rejection of the approach.[17]

4. Conclusion

Much of Bonbright's classic treatise on the principles of public utility rates has stood the test of time, and still provides a basis for useful reflection on principles of regulation and rate development. Today, a massive sea change is sweeping through the electric utility industry, finally inviting the realization of a service model, performance-based rate making, and the emergence of exciting non-utility markets. And so, some new interpretations of Bonbright's principles and even some new principles are in order. Bonbright's book was published 63 years after Samuel Insull delivered his call for public regulation of electric utilities,[18] and as history now shows, it was published at the point that might be called "peak central station" for the industry. Now that we are nearly 60 years into the new era of distributed energy resources, a new take on those valuable precepts is most timely.

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[17] Bonbright, at pp. 347-49.

[18] Insull (1898), *"Public Control and Private Operation,"* speech before the National Electric Light Assoc. (now Edison Electric Institute), Chicago (Jun. 7, 1898), available at: https://www.masterresource.org/edison-electric-institute/the-insull-speech-of-1898/.

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