

RATE DESIGN IS THE NEW INTEGRATED RESOURCE PLANNING, AND VICE VERSA

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ENERGY

RATE DESIGN IS THE NEW INTEGRATED RESOURCE PLANNING, AND VICE VERSA

Integrated Resource Planning (IRP) was developed in the 1970's and 1980's during what could be called the Soviet era of the power industry. Utilities and their regulators controlled virtually all resources within a jurisdiction. They could decide unilaterally which resources to add, modify or remove in that jurisdiction. It was an age of monopoly or at least hegemony, and thereby an age of central planning.

Modern rate design was developed somewhat earlier – in the 1960's – but also during the same Soviet era. Consumers had no alternatives to their local utility, and certainly, few if any decisions to make about distributed generation or storage. Consumers had only one choice for power, and utilities and their regulators determined unilaterally what consumers paid for that power.

The bottom line is that both IRP and rate design were based on a monopolist, central planning model. Resource planning generally occurred first and identified the assets required to meet demand, and then rate design occurred second to cover the costs of those assets.



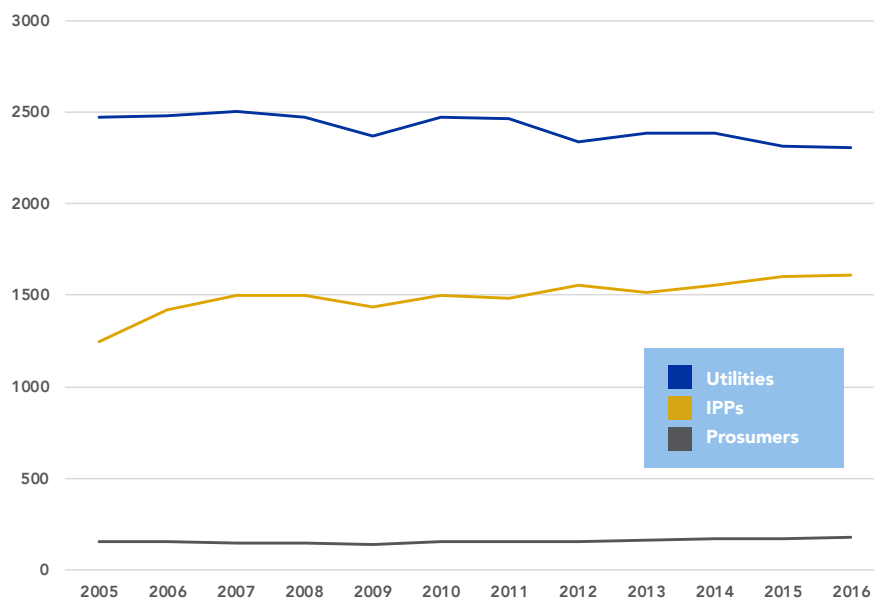
It is widely recognized and reported that the utility world is changing, and there is a range of efforts to adapt to this new world. For example, buying is replacing building, and IRPs are now much more about procurement than construction. Consumers now have more choices, so rate design is beginning to recognize competition.

However, IRP and rate design have not changed enough. It is time to recognize that the fundamental premise behind both IRP and rate design is no longer accurate. More and more resources being added to (removed from or modified on) the grid are not under utility's control. Instead, they are owned and operated by independent power producers (IPP's) and prosumers (consumers who also produce power). Consumers now have more choices in consuming, producing and storing power. IRP and rate design must now reflect this emerging reality.

IRP: PRICES NOT ASSETS

The figure below shows the split of United States electricity generation among three major categories: utilities, IPPs, and prosumers. Over the past several years, the utility share of grid generation has declined from roughly two-thirds to one-half, with IPP's and prosumers now constituting the other half. Authoritative projections are for a continued decline in the utility share, meaning that utilities and regulators will soon directly control less than half of the generation and storage resources on the grid.

Figure 1: Net Generation by Producer Type



Source: Energy Information Administration (EIA)

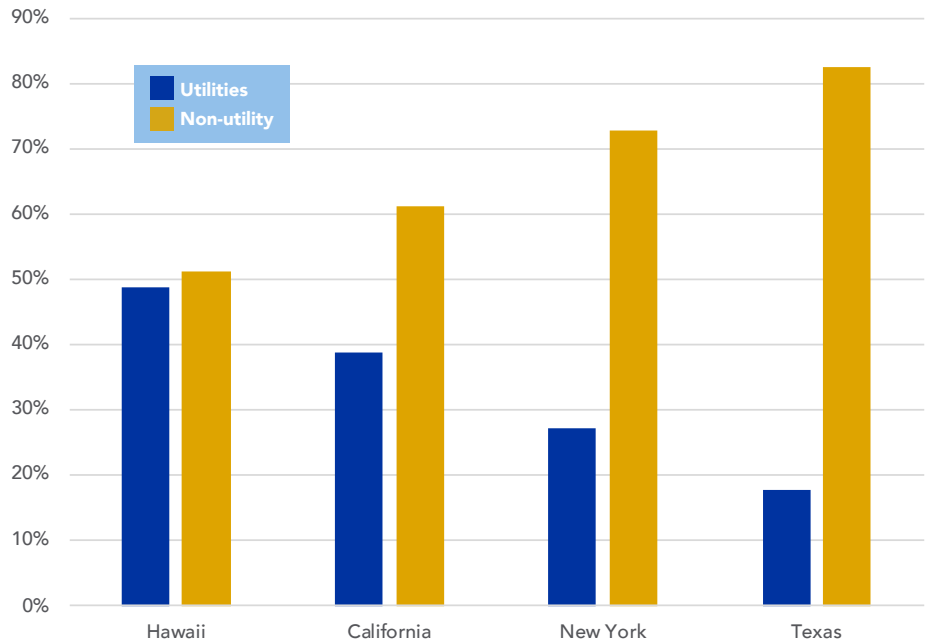
Of course, this aggregate graphic masks unique circumstances at a regional or state level. In many jurisdictions with a more deregulated market, the utility share has been small for years and continues to shrink.





In many jurisdictions with a more regulated market, the utility share has shrunk dramatically from high levels over a relatively short time with a “wave” of self-generation. The figure below shows the utility and non-utility share in a few key states. Two states are more deregulated – New York and Texas. Two are more regulated – Hawaii and California.

Figure 2: Net Electricity Generation Share



Source: Energy Information Administration (EIA)

In all these states, non-utility assets already utility assets – in some cases by a hefty margin. Going forward, utilities and their regulators will no longer be able to control many, most or all of the resources added to, removed from, or modified on the grid. The planning issue then for utilities and regulators is no longer what to do with these resources. Instead, the planning issue is what rules to set for others who control these resources. Moreover, much of what we mean by rules involves prices: what will it cost you to connect to the grid or what will I pay you for your grid services.

Because we have moved beyond the “centralized planning” model with a single actor to a grid “market economy” with multiple distributed actors, it is not merely that the impact of different rate designs can come up in IRP. Nor is it, as LBNL’s Future Electric Utility Regulation project indicates, simply that more attention needs to be paid in IRP to rate design.¹ Instead, it is that rate design is essentially replacing resource planning; resource plans will be implemented not directly through asset decisions but indirectly through pricing decisions. This realization is and should be transformative.

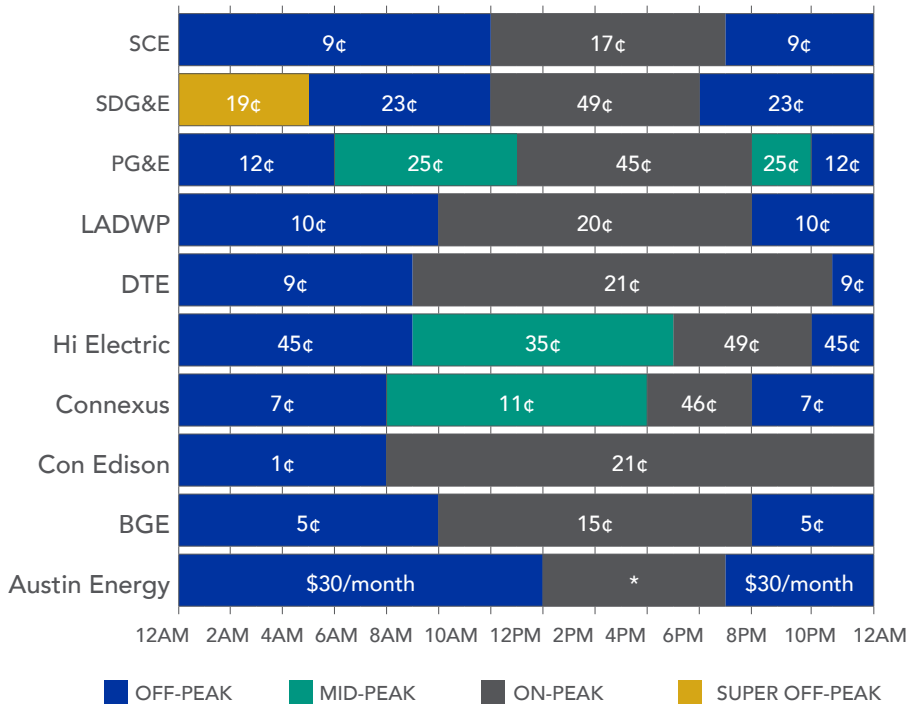
¹ Nancy Ryan and Arne Olsen, *The Future of Electricity Resource Planning*, Lawrence Berkeley National Laboratory, August 2016.

RATE DESIGN: INCENTIVES NOT COSTS

If rate design is the new IRP, what is the new rate design? How does rate design change when the local utility is no longer the only game in town?

The figure on below shows the tariffs for electric vehicle (EV) charging at various utilities. As the figure shows, tariffs vary by nearly a factor of fifty (1 cent vs. 49 cents) among different utilities at different times of the day. Even among California utilities on the same interconnected system at the same time of day, tariffs vary by nearly a factor of three.

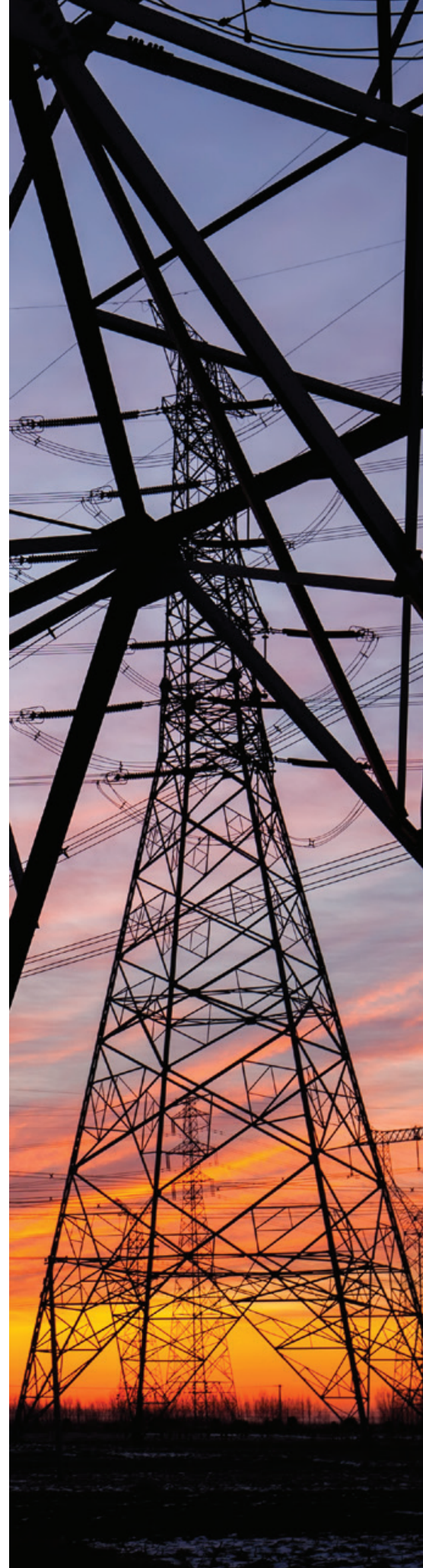
Figure 3: Tariff hours and rates (¢/kWh)



(*) Indicates charging is discouraged.
Source: Bloomberg New Energy Finance

These disparities make one observation abundantly clear. EV charging rates are not really about costs or cost recovery. While there may be underlying differences in costs, the differences among rates are much more about incentives. Con Ed's 1 cent rate appears to be designed to provide both a short-term incentive to charging at the desired time and a long-term incentive to purchase an electric vehicle. Hawaii Electric's 35 to 49 cent rate appears to be designed to have the opposite effect.

Of course, long-term aggregate rates need to cover long-term aggregate costs for economic sustainability. However, rates for individual customers or classes of customers do not need to reflect cost structure. In a world with multiple choices, it may make no business sense to do so. The post office stamp does not reflect cost structure; Amazon Prime does not reflect cost structure; the Golden Gate bridge toll does not reflect cost structure. Even in the utility industry, transmission rates often do not reflect cost structure.



If rates are not about costs, what are they about? They are about incentives. As Coley Girouard of Advanced Energy Economy said a recent Utility Dive article:²

"[Rates]...need to allow utilities to fairly recover the revenue required to maintain a system that provides safe, reliable, universal electricity service. But with customers more actively engaged with the electric power system, rate designs need to do even more. They need to send appropriate price signals so that customers are motivated to act in ways that benefit themselves and the grid as a whole."

The utility industry has only slowly begun to recognize the importance of incentives in rate design. James Bonbright, the "father" of modern rate design, mentioned incentives to discourage wasteful use of energy and encourage appropriate use of energy only as number 8 on a list of 8 criteria for setting rates.³ In NARUC's Distributed Energy Resources (DER) rate design manual, the word "cost" appears 582 times; the word "incentive" only 10 times. This emphasis on costs is reflected in NARUC's statement that the:⁴

... basic purpose of rate design is to implement a set of rates for each rate class—residential, commercial, and industrial—that produces the revenues necessary to recover the cost of serving that rate class.

In fairness, the manual does make passing reference to incentives using the term "price signals." It states "Ideally, rates are price signals for the consumption of electricity."

We politely suggest that this perspective is incomplete and out of date. Going forward, recognizing that rate design is, in fact, the new IRP and that customers have multiple choices, the primary **objective** of rate design should be to provide market participants with incentives to make the appropriate decisions based on economic, environmental and social goals.

These decisions include both operations and investments, aka resources. Costs are still relevant, but they are effectively a constraint, not an objective. The constraint on rate design is simply that adequate revenues must be collected to cover costs; otherwise, the system will not be sustainable.

CONCLUSION: GOING FORWARD

The fundamental paradigm underlying IRP and rate design needs to change. Band-aid adjustments are no longer appropriate. IRP should now be (mostly) about rates, and rates should now be (mostly) about incentives. This paradigm shift requires new thinking and new action on the part of key electricity market players: utilities, regulators, IPP's and consumers.

HOW NATHAN CAN HELP

Nathan is a private international economic and analytics consulting firm that works with government and commercial clients around the globe to deliver practical solutions and achieve lasting results. Whether building frameworks for economic growth or navigating regulatory hurdles, securing infrastructure financing or evaluating and assessing disputes, Nathan's experts serve as trusted partners, offering clients the analysis, technical advice, and strategies they need for sound decision-making.

Nathan is uniquely positioned to help electricity market players deal with the new realities of IRP and rate design. We work with grid stewards – utilities and regulators – to incorporate a rate design perspective in their IRPs, and an incentive perspective in their rates. We help them forecast the response of different market players to alternative rates and rules, and the implications of these responses for issues like resource adequacy and resilience. We work with market participants – IPPs and consumers – to evaluate the economic, environmental and social impacts of these rates and rules, and to communicate these impacts clearly to key private and public stakeholders. And lastly, we help identify and describe the rates and rules that best balance the multiple objectives of multiple market participants. ►

² Coley Girouard, *Rate Design for a DER Future: Designing Rates to Better Integrate and Value Distributed Energy Resources*, Utility Dive, February 12, 2018.

³ James Bonbright, *Principles of Public Utility Rates*, 1961.

⁴ The National Association of Regulatory Utility Commissioners (NARUC), *Distributed Energy Resources Rate Design and Compensation*, 2016.





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