



Edison Electric
INSTITUTE

Power by Association™

Memo

To: The Honorable Travis Kavulla, NARUC President and Vice Chairman of the Montana Public Service Commission

From: Philip Moeller, Senior Vice President

Date: February 14, 2016

Subject: Primer on Rate Design for Residential Distributed Generation

EEI applauds NARUC for their leadership in creating a committee that is solely focused on identifying and developing a compendium of various rate design options for States to use as a resource when considering adopting revised rate design methods.

Discussions over rate design changes meant to accommodate more variable customer generation are needed, but given the complexity involved are often unnecessarily contentious. We offer the ideas in the attached paper to proactively move these discussions forward so that more of this generation can be accommodated while protecting consumers who cannot participate in this fundamental transition.

We hope you find this material helpful and we look forward to continued dialogue on this issue.

cc: Greg White
Chris Villareal, Chair of the NARUC Staff Subcommittee on Rate Design

1.0 A Primer on Rate Design for Residential Distributed Generation

Executive Summary

Customer interest in the use of distributed generation (DG) systems, such as customer-owned rooftop solar systems, continues to grow. DG offers an attractive option for some customers, and utilities are actively examining the ways in which DG systems can be better integrated into the grid to enhance reliability, improve resiliency, reduce costs to consumers and to the grid and to improve the environment. Given the significant decline in the cost of solar photovoltaics (PV), coupled with the rapid growth in residential rooftop solar and other DG systems, policymakers across the country continue to examine how to update current net metering programs to address the cost shifting that occurs among customers and to ensure that everyone who uses the grid continues to share equitably in the costs of paying for the grid. The utility industry is investing more than \$20 billion annually in the grid to better integrate distributed generation and to enhance reliability and resiliency.

This paper identifies various options that update net metering policies. These include: demand charges; buy-sell arrangements; fixed monthly charges; time-varying rates; capacity charges; installed capacity fees; DG output fees; interconnection fees; minimum bills and standby rates.

This review of options is followed by a summary of actual case studies, drawn from a review of regulatory practice in 14 states with references to source documents. We have not evaluated the specific methods or commission decisions. The reader can draw his or her own conclusions.

I. Introduction

A. Background

In order to provide electricity to customers, a utility has to bear – directly or indirectly – costs related to generation, transmission, distribution, metering and customer service (such as billing and customer inquiry). Generation costs consist of capacity costs and energy costs. The former vary primarily with peak demand while the latter vary with electricity consumption. Distribution and transmission costs vary largely with demand. The costs of metering and customer services vary with the number and type of customers and are considered a fixed cost for each customer. Some of these costs also vary across time. Generation energy costs will vary from hour to hour depending on the marginal generation source. Distribution and some transmission networks, while used year round, are sized to meet peak demand at the locational level while the transmission system and generation capacity costs are sized to meet system peak demand.

According to the principle of cost causation, rates should be designed to reflect costs, to promote efficiency in the use of electricity and equity across customers. Rates for medium and large

commercial and industrial customers historically have done a better job of reflecting costs than residential rates, due primarily to the more advanced metering technology with which the larger customers are equipped. Residential rates are typically designed to cover most of the costs of residential service on the basis of energy consumption; with most of the fixed costs and capacity related costs rolled into this volumetric charge using some assumptions about class load factor.

Figure 1: The Mismatch between Energy Costs and Energy Pricing: An Illustrative Example from a Representative Investor Owned Utility

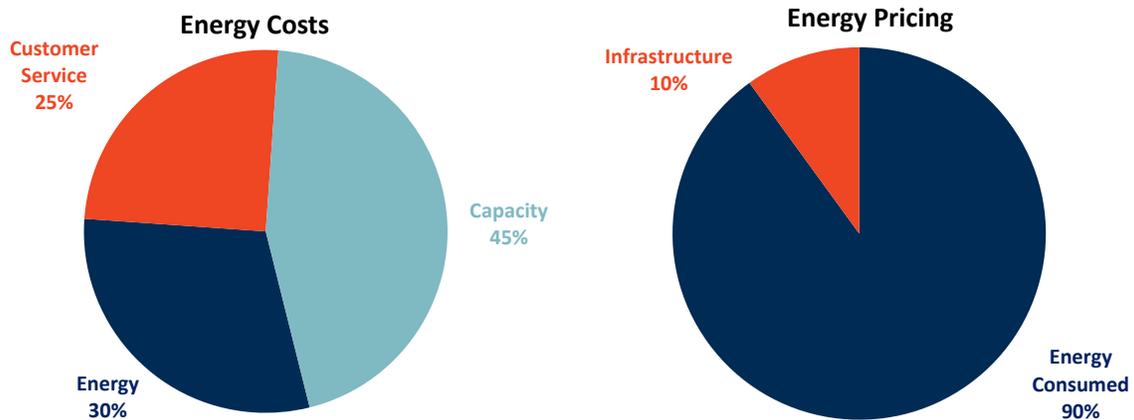


Figure 1: The Mismatch between Energy Costs and Energy Pricing: An Illustrative Example from a Representative Investor Owned Utility shows an example from a representative Investor Owned Utility of the difference between the calculated costs of serving a residential customer compared to the way that these costs are recovered by the utility. It is clear that even though only a fraction of the calculated costs vary with energy consumption, almost the entire amount of revenue is collected based on variable energy consumption charges (\$/kWh). With the recent increases in the amount of residential DG installed in most jurisdictions across the U.S., this volumetric rate structure, which is not cost-reflective, is increasingly failing to meet the objectives of good rate design.¹ This failure is exacerbated by the utilization of Net Energy Metering (NEM).

¹ Good rate design seeks to balance the competing goals of economic efficiency, removal of cross subsidies (equity) and utility revenue stability, among other objectives.

NEM pays the DG customer the retail rate for any generation that is fed into the grid. Customer-generators receive the same kWh credit regardless of the market price of the energy they are supplying into the grid.²

This arrangement introduces two problems:

- 1) **Customer-generators are not paying for grid and customer costs.** Customer-generators are being credited not just for the value of the energy they are producing, but also for the grid services that they are consuming, such as use of the transmission and distribution networks to receive and sell electricity. For example, a customer-generator can size a solar array to become a “net-zero” consumer, meaning over the course of the year they are producing as much energy as they consume. These customers will pay very little for their utility bills. Of course on a day to day basis, they are not net-zero consumer of energy. During the daytime they use the grid to export excess electricity and during the nighttime they use the grid to import electricity into their homes.³ Moreover, they rely on the grid to smooth out peaks and valleys in their generation profile due to the intermittency of distributed generation. In this way the grid acts as a free battery for DG customers.⁴ These customers need to be metered to track their net usage and billed each month to acknowledge their energy credits, which creates an additional cost. If there is a failure with their DG system, they can rely on the grid to meet their full power needs and call the utility’s customer service line for support. As a result, the cost of maintaining the grid and customer support services for these customers is borne by other customers who do not have self-generation.
- 2) **Customer-generators are trading a low-priced good for a high-priced good.** Electricity prices can be quite volatile over the course of a day and also vary seasonally. Rather than reflecting those prices, NEM simply treats all energy the same, regardless of the time at which it is produced.⁵ In most jurisdictions the time at which solar production peaks is not the same time when the system peaks. Electricity generation is more costly in peak periods than off-peak periods. Typically customer-generators will produce solar and in the middle of the day when the value is lower and consume electricity in the evening

² Most NEM policies have a “banking” mechanism where generation credits earned in one period can be used to offset consumption in another. Often these banking policies have a finite reconciliation period (typically one calendar year), after which any net excess generation credits earned over the entire period are paid out at some price. This is often not the full retail rate.

³ There are also seasonal imbalances.

⁴ Although no physical storage occurs.

⁵ Ashley Brown and Jillian Bunyan, “Valuation of Distributed Solar: A Qualitative View”, *The Electricity Journal*, December 2014, Vol. 27, Issue 10, p.33

when the value is higher, without having to pay the pricing differential on the electricity produced and consumed. This price differential will need to be paid by other customers who do not have self-generation. Another consequence of this pricing regime is that customers are incentivized to site DG to maximize kilowatt hours of production, not to maximize the market value of those kilowatt hours.

Proponents of NEM and similar policies argue that this explanation does not account for the benefits of solar for society as a whole. Some of these benefits (which are discussed in Section D) fit into the traditional cost of service framework, which focuses on costs directly borne by utility customers, such as avoided distribution capacity investments. Other benefits such as environmental amenities are not traditionally included in a cost of service. While often valuable for public policy investment decisions (i.e. “Is it in the public interest to engage in this action?”), including these (difficult to quantify) benefits will distort ratemaking decisions, since similar benefits are not fully accounted for in other societally beneficial programs such as grid-scale generation, Demand Response (DR) or Energy Efficiency (EE).

Conversely, many are concerned that some of the benefits of solar to the grid may be offset or eclipsed by increased distribution costs, such as the need to update distribution and communication networks to accommodate two-way power flows (These are discussed below in Section D).

B. Purpose

The purpose of this memorandum is two-fold. Firstly, we evaluate a number of different rate design options that are either in place today or have been proposed to help eliminate the cross-subsidization caused by current DG rate designs and NEM policies in particular. In states with significant residential DG penetration, these issues need to be tackled before they escalate further. In states without significant residential DG penetration, addressing these issues early will help avoid future conflict and also create a stable environment where customers can assess their DG investment decisions with greater information and certainty. Secondly we survey the state of DG rate design proceedings across the nation where decisions have either been reached or have been proposed and are undergoing review.

C. The Bonbright Principles of Rate Design

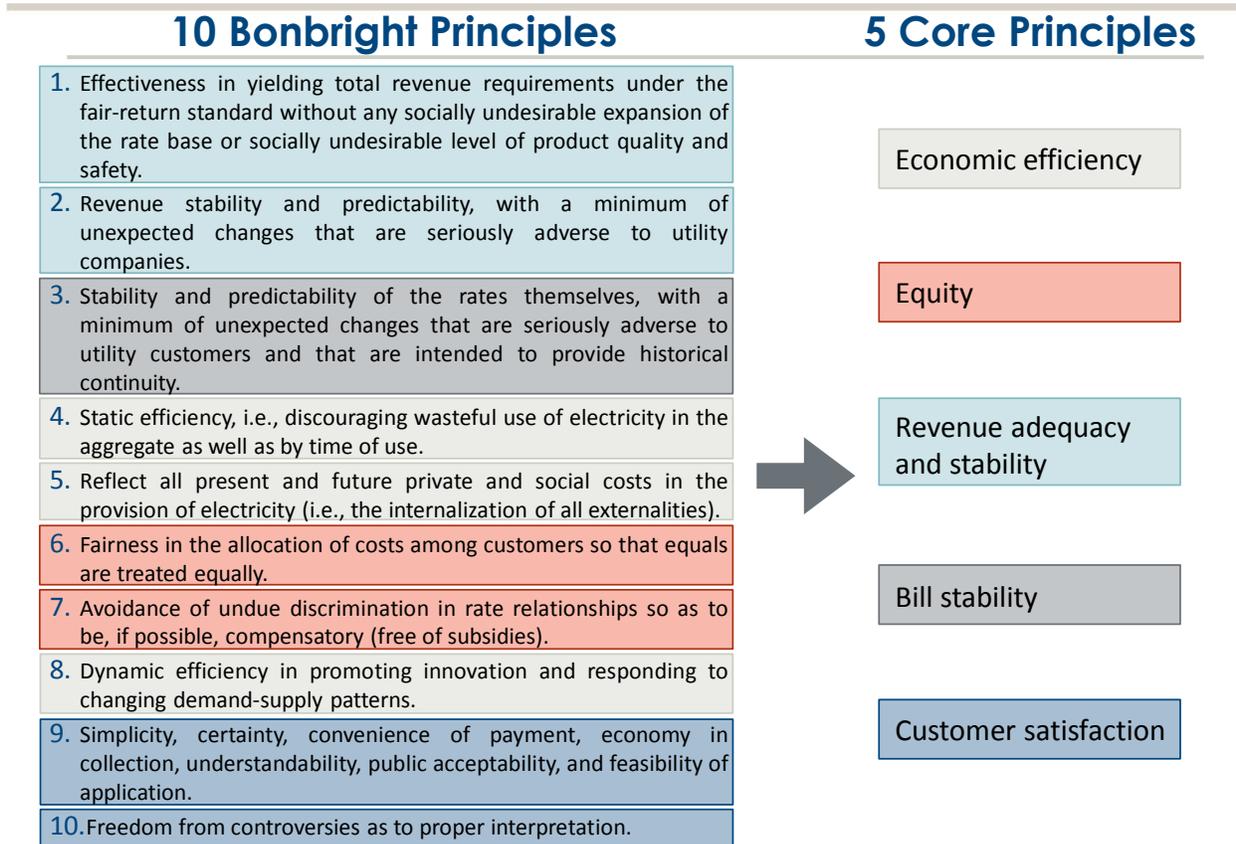
Professor Bonbright developed 10 Principles of Rate Design that are widely used as a foundation in designing rates.⁶ We have distilled these 10 principles, for which there is considerable overlap, into 5 Core Principles of Rate Design.

⁶ See James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, “Principles of Public Utility Rates, 2nd Edition”, Public Utilities Reports (March , 1988)

1. **Economic efficiency:** The price of electricity should convey to the customer the cost of producing it, ensuring that resources consumed in the production and, delivery of electricity, are not wasted. If the price is set equal to the cost of providing a kWh, customers who value the kWh more than the cost of producing it will use the kWh and customers who value the kWh less will not. This will encourage the development and adoption of energy technologies that are capable of providing the most valuable services to the power grid and the customers it serves.
2. **Equity:** There should be no unintentional subsidies between customer types. A classic example of the violation of this principle occurs under flat energy rate pricing structures (i.e., cents/kWh). Since customers have different load profiles, “peaky” customers, who use more electricity when it is most expensive, are subsidized by less “peaky” customers who overpay for cheaper off-peak electricity. Note that equity is not the same as social justice, which is related to inequities in socioeconomic status rather than cost. The pursuit of one is not necessarily the pursuit of the other, and vice versa.
3. **Revenue adequacy and stability:** Rates should recover the authorized revenue requirements of the utility and should promote revenue stability. Theoretically, all rate designs can be implemented to be revenue neutral within a class, but this would require perfect foresight of the future. Changing technologies and customer behaviors make load forecasting more difficult and increase the risk of the utility either under-recovering or over-recovering costs when rates are not cost reflective.
4. **Bill stability:** Customer bills should be stable and predictable while striking a balance with the other ratemaking principles. Rates that are not cost reflective will tend to be less stable over time, since both costs and loads are changing over time. For example, if fixed infrastructure costs are spread over a certain number of kWh’s in Year 1, and the number of kWh’s halves in Year 2, then the price per kWh in Year 2 will double even though there is no change in the underlying infrastructure cost of the utility.
5. **Customer satisfaction:** Rates should enhance customer satisfaction. Because most residential customers devote relatively little time focusing on reading their electric bills, rates need to be relatively simple so that customers can understand them and perhaps respond to the rates by modifying their energy use patterns. Giving customers meaningful cost-reflective rate choices helps enhance customer satisfaction.

Figure 2 shows the mapping between Bonbright’s original 10 principles and the 5 Core Principles defined above.

Figure 2: Deriving the 5 Core Principles of Rate Design



D. Value of Distributed Generation / Value of the Grid

The grid is a valuable resource that continues to be used extensively by customer-generators. Although they may be able to offset some of their own energy needs, customer-generators rely on the transmission and distribution systems to distribute excess electricity that they generate and supply electricity to them when production is less than consumption. This happens on an hourly basis since solar photovoltaic panels only generate energy when the sun shines and wind only generates energy when the wind blows. In addition, customer-generators rely on the grid to supply them their complete load needs in the event that their self-generation fails. Throughout this process, customer-generators rely on the utility’s customer support to track net energy usage using a metering system that needs to be read and maintained, supply bills and the customer support necessary to answer bill inquiries or any customer issues such as outages.

Customer-generators may also increase the cost of using the grid for themselves and other customers on an ongoing basis. On the generation side, utilities need to procure ancillary services to help integrate distributed generation to the grid. DG resources are for the most part intermittent and flexible capacity needs to be procured to meet intra-hour variability in

generation as well as rapid ramping requirements for the evening when load peaks and the sun goes down. On the distribution and transmission side, system upgrades may need to be made to deal with two-way power flows and voltage quality issues. Further upgrades could be required for communication networks and the IT infrastructure. On the customer support side, customer-generators may have more complex billing, metering and support needs.

The electric system benefits (e.g. cost savings) attributable to DG can include energy, capacity, transmission and distribution (T&D) system deferral, and line loss reductions, as well as environmental and other benefits as assessed in each jurisdiction. The National Renewable Energy Laboratory recently summarized these potential benefits in a report about the value of solar.⁷

II. Menu of Rate Reform Options

A. Demand Charges

Demand charges provide accurate price signals and have been used widely in the industry, along with fixed monthly charges and energy charges, in the industry for commercial and industrial rates for the better part of the last century. Utilities can introduce a demand charge (\$/kW) for customer-generators, to better collect the capacity costs associated with providing them electric service, in addition to collecting from them a monthly fixed charge (\$/month) and a variable energy charge (\$/kWh). A demand charge is a charge based on a customer's maximum kW demand over a specified time period – typically the monthly billing cycle. It is typically based on the customer's maximum demand across all hours of the month or on their maximum demand during peak hours of the month, or sometimes on both. Since most capital grid investments are driven by demand, the idea is that demand charges will better align the price that customers pay with the costs that they are imposing on the system. The primary function of the demand charge is to accurately convey the cost structure of electricity to customers so that they can make informed decisions about how much power to consume and at what time. Whether customers reduce demand in response to a demand charge is a secondary benefit. There is some evidence that residential customers do respond to the price signal given by demand charges.⁸

⁷ Mike Taylor, Joyce McLaren, Karlynn Cory, Ted Davidovich, John Sterling, and Miriam Makhyoun, "Value of Solar: Program Design and Implementation Considerations," NREL Technical Paper NREL/TP-6A20-6236.1, 2015.

⁸ See:

- Andreas Stokke, Gerard Doorman, and Torgeir Ericson, "An Analysis of a Demand Charge Electricity Grid Tariff in the Residential Sector," Discussion Paper 574, Statistics Norway Research Department, January 2009;

When faced with demand charges, residential customer-generators would have the incentive to buy smart digital technologies such as thermostats, load controllers, home energy management systems and smart appliances, along with batteries and other storage options. This will promote economic efficiency in both a static and dynamic sense.

B. Buy-Sell Arrangement

Many NEM policies compensate customer-generators at the full variable charge in the retail rate. As discussed previously, when rates disproportionately collect revenue through that variable charge, customer-generators are overcompensated for the electricity they generate. Under a “buy-sell” arrangement, customer-generators would pay for all of the electricity that they consume at the full retail rate, and would separately be compensated for all of the electricity that they generate at a price that more accurately reflects the value of the electricity being generated. Such compensation can be at the wholesale price, at the “avoided cost” rate, or at the “value of renewables” rate. One advantage of such plans is that it separates compensation for customers’ generation from the retail rate structure, allowing separate consideration of the pluses and minuses of each. Another advantage is that a customer’s incentives for conserving electricity or shifting load are aligned with those of other customers, since the customer pays the full retail rate for all energy consumed. This approach is also commonly referred to as a “value of solar” model, a feed-in-tariff (or “FIT”), or a dual meter tariff since it requires a second meter to measure on-site generation.⁹

C. Fixed Monthly Charge

Most residential rates currently offered in the U.S. include a fixed monthly charge (sometimes called a customer charge, basic service charge or customer service charge) that is approximately in the range of \$5-\$15/month along with an energy charge. While the size of the customer charge may be consistent with the magnitude of fixed customer costs like metering, billing, customer care and other administrative services, it typically does not account for the fixed costs

-
- Thomas Taylor and Peter Schwartz, “A Residential Demand Charge: Evidence from the Duke Power Time-of-Day Pricing Experiment,” *Energy Journal* 7(2)(April 1986): pp. 135–151;
 - Douglas Caves, Laurits Christensen, and Joseph Herriges, “Modeling Alternative Residential Peak-Load Electricity Rate Structures,” *J. Econometrics*, 1984;
 - Thomas N. Taylor, “Time-of-Day Pricing with a Demand Charge: Three-Year Results for a Summer Peak,” in *Award Papers in Public Utility Economics and Regulation*, Michigan State University Institute of Public Utilities, Michigan, 1982.

⁹ There are nuanced differences in these approaches, mostly revolving around how to determine the price that is paid to customer-generators for their power generation. But at a basic level, all of these approaches include a bifurcation of power purchases from the grid from power sales to the grid.

of generation, transmission, and distribution capacity that must be recovered by the utility over time. Increasing the fixed charge allows some or all of that capital investment to be recovered with relative certainty for the utility. Fixed charges do not offer the pricing signal to reduce peak demand that is accomplished with demand charges.

D. Time-Varying Rates

The variable charge can also be modified to include time-differentiated prices, with a higher price being charged during on-peak hours and a lower price during off-peak hours, reflecting the corresponding variation in utility capacity and energy costs by on-peak and off-peak periods. While this change by itself would not eliminate the cross-subsidies created by net energy metering, it would be consistent with the idea of modifying rates to better reflect the underlying cost structure. Time-varying energy charges can be combined with other rate design options, such as a demand charge, to better reflect the utility's underlying cost structure. When faced with time-varying rates, residential customer-generators would have better incentives to buy smart digital technologies such as thermostats, home energy management systems and smart appliances, along with batteries and other storage options. Customer-generators would also be better incentivized to site DG facilities so as to maximize the value of production, not just the volume of output. This will help to promote economic efficiency in both a static and dynamic sense.

E. Capacity Charge

A charge can be levied based on the size of a customer's connected load. This limits the amount of demand that a customer can place on the system. Customers whose load exceeds the capacity that they have reserved will be temporarily disconnected until they reduce their load, much like when a circuit breaker is tripped. These rates are deployed for all residential customers in France, Italy and Spain.

F. Installed Capacity Fee

A charge can be levied on customer-generators based on the installed capacity of their DG systems. This results in an additional fixed monthly charge for customer-generators, with the size of that charge being determined by the customer's generation capability. The reasoning behind this design is that customers with larger systems will self-generate more electricity, thereby avoiding paying a larger portion of their grid costs and justifying a larger offsetting incremental monthly charge on their bill. While redressing some of the cross-subsidies caused by net energy metering, the relationship to cost-causation with this approach is less direct than with the other approaches described above.

G. DG Output Fee

Somewhat similar in concept to the capacity charge, a DG output fee would charge customer-generators based on the total amount of electricity that they produce from on-site generation each month. In other words, the customer-generators would still be paid for the electricity that they generate, but some of this payment would be offset by the DG output fee. Whereas the capacity charge is a dollars-per-kilowatt charge, the DG output fee is a dollars-per-kilowatt-hour charge. The DG output fee reflects the customer's cost of using the distribution system. This approach has also been referred to as a "bidirectional distribution rate."¹⁰

H. Interconnection Fee

Customer-generators are increasingly being charged a one-time grid interconnection fee at the time that they install on-site generation. These fees are generally proposed to cover one-off costs incurred in setting up a customer-generator on the utility's system, for example account and billing set-up, application review, engineering review, interconnection facilities, secondary meters, etc. Interconnection charges that are solely focused on recovering interconnection costs are usually proposed concurrently with other rate reforms, since they do not address the key NEM cost-shift issue. Theoretically an interconnection fee could be levied to recover the cost of the sunk investment in the grid that would still be used to serve these customers, but which would otherwise no longer be recovered through their rates (under NEM conventions) once the DG system is installed.

I. Minimum Bill

An alternative to a higher fixed monthly charge is a minimum bill. The minimum bill ensures that all customers will pay a minimum threshold amount each month. For instance, with a minimum bill of \$50/month, a customer whose bill would have been \$30 under the existing rate for a given month would be billed \$50 for that month. In a different month, if the customer's bill under the existing rate would be \$60, then the minimum bill feature would not come into play and their bill would remain unchanged. The theory is that the minimum bill amount can be associated with the average customer's cost of using the grid and therefore guarantee that amount to be recovered on a monthly basis.

J. Standby Rates

Standby rates are generally levied on large "partial requirements" customers who generate all or some of their own electricity. Under the normal run of business, these facilities will generate

¹⁰ Carl Linvill, John Shenot, and Jim Lazar, "Designing Distributed Generation Tariffs Well," prepared for the Regulatory Assistance Project, November 2013.



their own power and their draw from the grid will be limited. However, in the event of a scheduled or emergency outage of their generation equipment, they will need to rely entirely on power purchased from the grid. Along with an energy charge, standby rates generally consist of a demand charge which attempts to cover the cost to the utility of providing capacity to meet the facility's peak demand, in the eventuality that it will be required to do so, as well as an energy charge.

III. Key Decisions in the DG Rate Reform Transition

A. Customer-Generators or All Residential Customers

A key question is whether the new rate should apply only to customer-generators or all residential customers. Modifying the rate only for customer-generators has the advantage of restricting the immediate bill impacts of the rate change to a small subset of the utility's customers. This limits the number of customer considerations that must be made when evaluating the rate. Since customer-generators have a different load profile than other customers and are acting both as consumers and as generators, their unique status warrants the creation of a specific rate class. Offering special rates to customer-generators is analogous to the development of "standby rates" for "partial requirements" customers in the commercial and industrial classes. Alternatively, if the proposed rate changes are cost-based and represent an overall improvement upon the existing rate structure according to sound principles of rate design, then it could be argued that only making these changes for customer-generators is a missed opportunity to improve the rate design of the entire residential class.

B. Grandfathering

Typically, significant changes to the DG rate and/or the NEM policy have been accompanied by a grandfathering rule that allows existing customer-generators to continue to be billed under the old pricing policy. The argument for this approach is that those customers made the decision to purchase their DG systems under a pre-established pricing agreement with the utility – or at least with the expectation that the existing arrangement would continue to be honored in the future. The grandfathering policy avoids placing an unexpected financial burden on those customers under the new pricing structure. The counterargument to such a grandfathering policy is that all investments are subject to the risk that future policies can change, and that DG investments are no different in this regard and should therefore not be given any special treatment. Good rate design early on will create cost reflective rates that mean that grandfathering will never become an issue.

Some of the issues with not pursuing a grandfathering policy have recently come to the fore in Nevada, where in December 2015, regulators created both a new rate and rate class for customer-generators, and retroactively applied this to existing solar customers. The decision by the Nevada Public Utilities Commission sparked a class action lawsuit against Nevada utility NV Energy, with plaintiffs alleging the utility misled them into purchasing solar systems "that do not provide

the promised rebates, discounts and rates.”¹¹ Other critics also have challenged the legality of the decision, claiming it may violate the contracts clause of the U.S. Constitution by undermining existing agreements between solar companies and electricity consumers.¹² However, in a February 2016 filing, NV Energy said it supported a plan to grandfather existing solar customers under the old rate for twenty years. Shawn EliceGUI, a senior vice president for regulation and planning at NV Energy, said for any grandfathering plan to be accepted, it “needs not only to be fair, but, equally important, broadly perceived and accepted as fair.”¹³

C. Transition Plan

In general, all customers will need to be educated about the new rate in order to improve their understanding of the rate’s design as well as ways that they can manage demand and the impact on their bill. Beyond a broad educational outreach campaign, more targeted outreach may be needed for those specific customers who are likely to experience a bill increase on the new rate, particularly low income or vulnerable customers. Those customers could be identified through bill impact analysis of utility load data, surveys, and other analyses based on locational socio-demographic data.

In addition to education, a rate transition plan might include any of the following elements, though it is important to recognize that the applicability of these options will vary from one state to the next depending on the objectives goals of the local regulators, utilities, and their stakeholders:

- A gradual multi-year phase-in of the new rate regime, so that customers do not experience the full impact of the new rate overnight.

¹¹ Julia Pyper, “Solar Customers Launch a Class Action Lawsuit Against NV Energy,” Greentech Media, February 4, 2016, accessed on February 8, 2016, <http://www.greentechmedia.com/articles/read/solar-customers-launch-a-class-action-suit-against-nv-energy>

¹² Julia Pyper, “Does Nevada’s Controversial Net Metering Decision Set a Precedent for the Nation?” Greentech Media, January 17, 2016, accessed on February 8, 2016, <http://www.greentechmedia.com/articles/read/nevada-net-metering-decision>.

¹³ Daniel Rothberg, “NV Energy: Let existing solar customers keep old rate for 20 years,” Intelligent Utility, February 5, 2016, accessed on February 8, 2016, http://www.intelligentutility.com/article/16/02/nv-energy-let-existing-solar-customers-keep-old-rate-20-years?utm_source=2016_02_08&utm_medium=eNL&utm_campaign=IU_DAILY&utm_content=69764

- Temporary bill protection, so that customers have time to become accustomed to the impact and explore energy and demand management opportunities before it impacts their bills.
- Optional rate exemptions for a limited subset of the residential class who are considered low income or vulnerable, to avoid the possibility of bill increases for these customers.
- Primary market research, such as focus groups and surveys, to determine the most effective ways to market the rate to customers.

D. Decoupling

Revenue decoupling is a mechanism that disassociates energy sales from revenue recovery. Under net energy metering, customer-generators do not pay their full cost of service. In the short-run, (between rate cases) this shifts the cost burden of this lost revenue to the utility. This can create uncertainty over future revenues for the utility and increase its cost of capital (due to increased risk). However, in the long-run rates for all customers, including those without DG, will increase. In this way, customer-generators shift their costs onto other customers. Revenue decoupling will make the utility whole, by creating an adjustment mechanism for “lost” sales from customer-generators. However, since these “lost” sales did not cause a drop in grid and customers costs, this adjustment mechanism means that other non-DG customers will be paying for the costs that customer-generators continue to incur.

IV. The National Landscape of DG Rate Reforms

This section describes major DG policy activities across 13 states. The list is neither exhaustive nor static, since DG policy reform is moving forward at a rapid pace across the US.

A. Arizona (Status: Complete / Pending)

In February 2015, the Salt River Project (“SRP”) Board of Directors approved E-27, the Customer Generation Price Plan for Residential Service.¹⁴ Unlike investor-owned utilities (“IOUs”), SRP is a publicly-owned utility that is regulated by a board of directors elected by landowners. E-27 is a three-part rate which only applies to residential customers who elect to install distributed generation (“DG”).¹⁵ The fixed charge varies with a customer’s amperage and ranges from \$32.44/month to

¹⁴ Scott Harelson, “SRP Board Approves Reduced Price Increases,” Salt River Project press release, February 26, 2015, accessed on July 1, 2015, <http://www.srpnet.com/newsroom/releases/022615.aspx>.

¹⁵ Ahmad Faruqui and Ryan Hledik, “An Evaluation of SRP’s Electric Rate Proposal for Residential Customers with Distributed Generation,” prepared for Salt River Project, January 2015, p.14, accessed February 3, 2016, <http://www.srpnet.com/prices/priceprocess/pdfx/DGRateReview.pdf>.

\$45.44/month, both higher than the \$20 monthly fixed charge to non-DG customers. The demand charge is structured as an increasing block rate and varies by season and, ranging in the peak summer months of July and August from \$9.59/kW-month for a customer's first 3 kW of demand, to \$17.82/kW-month for the next 7 kW of demand, to \$34.19/kW-month for demand in excess of 10 kW.¹⁶ Customers who installed DG or had a contract submitted to SRP on or prior to December 8, 2014 are grandfathered on the non-DG suite of price plans.

In July 2013, Arizona Public Service ("APS") proposed a new net metering policy for customer-generators. APS proposed two rate options: the first option would put customer-generators on a three-part rate and continue to compensate them for their generation at the full retail rate; the second option was a buy-sell arrangement under which customer-generators would have all consumption billed under one of the existing rate options, but they would be paid a lower wholesale rate for the total amount of electricity that they generate.

In November 2013, the Arizona Corporation Commission ("ACC") instead voted to implement a \$0.70/kW grid access charge on installed solar photovoltaic ("PV") capacity, equating to a surcharge of roughly \$5/month for a typical residential rooftop solar installation.¹⁷ In April 2015, APS requested an increase from \$0.70/kW to \$3.00/kW on its monthly grid access charge on installed solar PV capacity.¹⁸ However, the ACC staff asked the Commission to reject the increase and asked the company to include the rate increase in its next general rate case application.¹⁹ On September 25, 2015, APS offered to withdraw the proposed grid access charge in favor of opening a modified hearing that would exclusively address the cost of serving solar and non-solar customers, as well as the structure of how those costs would be collected. On October 20, 2015, the ACC ordered the proceeding closed and found that it is in the public interest to require APS to

-
- ¹⁶ "SRP Standard Electric Price Plans: Salt River Project Agricultural Improvement and Power District, Temporary Prices Effective November 2015 – April 2016 Billing Cycle," Salt River Project, October 6, 2015, pp. 29-30, accessed February 3, 2016, <http://www.srpnet.com/prices/priceprocess/pdfx/April2015RatebookPUBLISHED.pdf>.
- ¹⁷ "APS's Proposal to Change Net-Metering," ASU Energy Policy Innovation Council, updated December 2013, pp. 2, 3, and 5, accessed February 1, 2016, https://energypolicy.asu.edu/wp-content/uploads/2013/12/APS-Net-Metering-Brief-Sheet-Draft--Final_updated-Dec-2013.pdf.
- ¹⁸ "APS Asks to Reset Grid Access Charge for Future Solar Customers," APS press release, April 2, 2015, accessed on July 20, 2015, <https://www.aps.com/en/ourcompany/news/latestnews/Pages/aps-asks-to-reset-grid-access-charge-for-future-solar-customers.aspx>.
- ¹⁹ Robert Walton, "AZ Regulatory Staff Rejects Solar Net Metering Changes outside Full Rate Case," Utility Dive, June 12, 2015, accessed on July 20, 2015, <http://www.utilitydive.com/news/az-regulatory-staff-rejects-solar-net-metering-changes-outside-full-rate-ca/400656/>.

file a rate case no later than June 30, 2016.²⁰ Additionally, on October 20, 2015, the ACC ordered APS's cost of service issues to be included in a generic document on net metering issues and the value of distributed energy.

UNS Energy Corporation, the Arizona-based parent company of Tucson Electric Power and UniSource Energy Services, asked the ACC to approve a mandatory three-part rate for customer-generators who submit connections for new DG facilities after June 1, 2015. While this three-part rate would be optional for standard residential customers, UNS is also proposing an increased fixed charge for all residential customers that would be set at \$20/month, an increase from the current \$10/month.²¹ Additionally, the utility is proposing to purchase excess energy from new rooftop systems using the Renewable Credit Rate, which would be set to the market price for power generated by large solar arrays.²² This will initially be set at \$0.0584/kWh and updated on an annual basis.²³ Currently, customer-generators can participate in a net metering program in which excess generation is credited at the standard retail rate.²⁴

B. California (Status: Final Order)

In October 2013, California Assembly Bill 327 ("AB 327") was enacted, directing the California Public Utility Commission ("CPUC") to reform residential rates by December 31, 2015.²⁵ This state legislation requires deriving a new framework for analyzing the benefits and costs that DG produces for the grid and for the public. This initiative was called "NEM 2.0".

²⁰ Arizona Corporation Commission, *Order Rescinding Decision No. 75251, Dismissing APS's Motion to Reset and Closing Docket No. E-01345A-13-0248*, Docket No. E-01345A-13-0248, October 27, 2015.

²¹ "Unisource Energy Service Seeks Approval of New Electric Rates to Better Reflect Customers' Use of its Upgraded Utility System," UniSource Energy Services press release, May 5, 2015, accessed on July 10, 2015, <https://www.uesaz.com/news/newsroom/release/index.php?idRec=342>.

²² Arizona Corporation Commission, *Application*, Docket No. E-04204A-15-0142, May 5, 2015, pp. 8-9, https://www.uesaz.com/doc/UNSE_Rate_Application.pdf.

²³ "UES Seeks New Electric Rates to Reflect Higher Costs," UniSource Energy Services, accessed on July 10, 2015, <https://www.uesaz.com/news/updates/e-rates/>.

²⁴ Herman K. Trabish, "What's Solar Worth? Inside Arizona Utilities' Push to Reform Net Metering Rates," Utility Dive, June 1, 2015, accessed July 28, 2015, <http://www.utilitydive.com/news/whats-solar-worth-inside-arizona-utilities-push-to-reform-net-metering-r/399706/>.

²⁵ California State Assembly, *Assembly Bill No. 327*, October 7, 2013, pp. 91-92, http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB327.

On January 28, 2016, the CPUC voted 3 to 2 approving a NEM 2.0 successor tariff.²⁶ In this decision, the Commission declined to “impose any demand charges, grid access charges, installed capacity fees, standby fees, or similar fixed charges on NEM residential customers while the CPUC is working on how, if at all, any such fees should be developed for residential customers.”²⁷ The decision upholds the current retail rate for customer-generators, preserving the basic features of the existing NEM tariff. In reference to the three IOU proposals as a whole, the CPUC commented, “The differing methods of analysis and proposed charges strongly suggest that more work is indicated before any major shifts in the paradigm for the NEM successor tariff are implemented.”²⁸

However, the CPUC did accept three notable changes to the NEM tariff, specifically related to Time-of-Use (“TOU”) rates, non-bypassable charges, and interconnection fees. With respect to TOU rates, the CPUC explained, “participation in available TOU rates can be an effective way to align the incentives of customers on the NEM successor tariff with the system needs.”²⁹ As a result, the NEM 2.0 requires that all participating customers must be on a TOU rate with no option to opt out.³⁰ The default TOU rates for residential customers are anticipated to be in place by 2019.³¹ The Commission also changed its treatment of non-bypassable charges that NEM customers are required to pay. Under the original NEM tariff, customers pay the non-bypassable charges embedded in their volumetric rates. They do so, however, only on the quantity of energy delivered from the grid less any generation credits. Under NEM 2.0, the tariff mandates customers pay non-bypassable charges on the full amount of electricity delivered from the grid, rather than the portion netted for generation credits. However, the CPUC did eliminate transmission charges from the bundle of charges that qualify as non-bypassable.³² Lastly, the CPUC agreed with the IOUs’ proposals to institute a one-time interconnection fee that will “allow the utility to recover the costs of providing the interconnection service from the customer benefitting from the interconnection.”³³ Based on the IOUs’ proposals, this interconnection fee is estimated to range from \$75 to \$150 depending on the utility.³⁴

²⁶ Public Utilities Commission of the State of California, *Decision Adopting Successor to Net Energy Metering Tariff*, Rulemaking 14-07-02, January 28, 2016.

²⁷ *Ibid.*, p. 2.

²⁸ *Ibid.*, p. 75.

²⁹ *Ibid.*, p. 76.

³⁰ *Ibid.*, p. 92.

³¹ *Ibid.*, p. 92.

³² Under NEM 2.0, non-bypassable charges include Public Purpose Program Charge, Nuclear Decommissioning Charge, Competition Transition Charge, and Department of Water Resources bond charges; *Ibid.*, pp. 89-90.

³³ *Ibid.*, pp. 87-88.

³⁴ Jeff St. John, “California Net Metering 2.0 Keeps Retail Rates for Rooftop Solar,” Greentech Media, December 15, 2015, accessed February 5, 2016,

C. Hawaii (Status: Final Order – Phase 1)

In January 2015, Hawaiian Electric Company (“HECO”) proposed to the Public Utilities Commission of Hawaii to close NEM to new customer-generators and replace it with a Transitional Distributed Generation (“TDG”) tariff that would cut the rate paid for power sold back to the grid by approximately fifty percent.³⁵ This proposal includes a \$25 minimum monthly bill for all future residential customer-generators on all islands.³⁶ On June 29, 2015, HECO submitted a final position to the Commission in which it reiterated closing the current NEM program to new customer-generators.³⁷

On October 12, 2015, the Commission responded to HECO’s request with an order that approved “revised interconnection standards to streamline and improve HECO Companies’ interconnection process, closes the HECO Companies’ net energy metering program to new participants, and approves new options for customers to interconnect distributed energy resources to the HECO Companies’ electric grids.”³⁸ The order approved HECO’s ‘Grid-Supply’ tariff, under which customer-generators are credited for their excess energy at \$0.1507/kWh in Oahu, \$0.1514/kWh in Hawaii, \$0.1716/kWh in Maui, \$0.2407/kWh in Molokai, and \$0.2788/kWh in Lanai.³⁹ The Commission’s order marked the completion of Phase 1 of a multi-phase distributed energy resources (“DER”) policy change project. Phase 2 will address further long-term modifications to DER policies including how to enhance the value of DER.⁴⁰ Additionally the Commission approved the \$25 minimum bill for residential customer-generators and a \$50 minimum bill for small commercial customer-generators that are interconnecting under HECO’s self-supply tariff.⁴¹

<http://www.greentechmedia.com/articles/read/breaking-california-net-metering-2.0-keeps-retail-rates-for-rooftop-solar>.

³⁵ Public Utilities Commission of the State of Hawaii, *Hawaiian Electric Companies’ Motion for Approval of New Program Modification and Establishment of Transitional Distributed Generation Program Tariff*, Docket No. 2014-0192, January 20, 2015.

³⁶ Ibid, p. 6.

³⁷ Public Utilities Commission of the State of Hawaii, *Final Statement of Position of the Hawaiian Electric Companies*, Docket No. 2014-0192, June 29, 2015, pp. 5-8, 91.

³⁸ Public Utilities Commission of the State of Hawaii, *Decision and Order Resolving Phase 1*, Docket No. 2014-0192; Order No. 33258, October 12, 2015, p. 1.

³⁹ Customer Grid Supply and Self Supply Programs, HECO, <https://www.hawaiianelectric.com/clean-energy-hawaii/producing-clean-energy/customer-grid-supply-and-self-supply-programs>.

⁴⁰ Ibid, p. 2

⁴¹ Ibid, p. 122.

D. Illinois (Status: Pending)

In March 2015, Senate Bill 1879 (“SB 1879”) and House Bill 3328 (“HB 3328”) were introduced in Illinois’ state Senate and Assembly, proposing to add a demand charge to the current residential rates design (among a number of other items concerning Illinois’ electric grid).⁴² As of February 5, 2016, neither bill had been passed by its respective house.⁴³

E. Kansas (Status: Deferred)

In its 2015 general rate case, Westar Energy proposed to introduce two new rates for its residential customers.⁴⁴ One rate, the “Residential Stability Plan” (RSP), would include a \$50/month fixed basic service fee and a lower volumetric charge.⁴⁵ The other new rate, referred to as the “Residential Demand Plan” (RDP), would be a three-part rate with a demand charge, a fixed basic service fee, and a volumetric rate.⁴⁶ In its filing, Westar also proposed to make the RSP and RDP rates the only two residential rate options that would be available for net metering customers.⁴⁷ Westar’s proposal to introduce the RSP and RDP rates was withdrawn as part of a settlement which was approved by the Kansas Corporation Commission in September 2015.⁴⁸ However, in the same order, the Commission approved

⁴² “HB 3328/SB1879 Offers a Comprehensive Plan for Illinois’ Energy Future,” Commonwealth Edison, news release, March 19, 2015, accessed July 27, 2015, https://www.comed.com/newsroom/pages/newsroomreleases_03192015.pdf?FileTracked=true.

⁴³ Illinois General Assembly, “Bill Status of SB1879,” accessed February 5, 2016, <http://www.ilga.gov/legislation/BillStatus.asp?DocNum=1879&GAID=13&DocTypeID=SB&SessionID=88&GA=99>; Illinois General Assembly, “Bill Status of HB3328,” accessed February 5, 2016, <http://www.ilga.gov/legislation/BillStatus.asp?DocTypeID=HB&DocNum=3328&GAID=13&SessionID=88&LegID=89510>.

⁴⁴ State Corporation Commission of the State of Kansas, *Application of Westar Energy Volume II Minimum Filing Requirements*, Docket No. 15-WSEE-115-RTS, March 2, 2015, pp. 293-295, 332-334, <http://estar.kcc.ks.gov/estar/ViewFile.aspx/S20150302143551.pdf?Id=74e4c4cf-8c4d-4f30-95cc-59ce1417777b>.

⁴⁵ State Corporation Commission of the State of Kansas, *Direct Testimony of Ahmad Faruqui on behalf of Westar Energy*, Docket No. 15-WSEE-115-RTS, 2015, p. 20, https://www.westarenergy.com/Portals/0/Resources/Documents/RateCasePDF/Direct_Testimony_of_Ahmad_Faruqui_on_behalf_of_Westar_Energy.pdf.

⁴⁶ *Ibid*, p. 20-21.

⁴⁷ *Ibid*, p. 3-4.

⁴⁸ State Corporation Commission of the State of Kansas, *Order Approving Stipulation and Agreement*, Docket No. 15-WSEE-115-RTS. September 24, 2015, p. 17,

Westar’s proposal for the creation of a Standard Residential Distributed Generation Tariff. The order stated that the decision of how to redesign and restructure rates for customer-generators, including potential revision of the new Standard Residential Distributed Generation Tariff, would be revisited at a later time in a generic docket.⁴⁹

F. Maine (Status: Pending)

In response to legislation enacted by the Maine legislature in 2014, the Maine Public Utilities Commission released a study in March of 2015 that estimated the value of DG based on ten different components.⁵⁰ The report concluded the long-term value of solar equates to \$0.337/kWh,⁵¹ which is higher than the approximate net metering retail rate of \$0.13/kWh.⁵² In an effort to allow customer-generators to capture more of the estimated value of solar, lawmakers passed a bill in June of 2015 that would require the legislature to develop an alternative pricing mechanism to net metering by the end of January 2016.⁵³ Proposals to the alternative pricing mechanism include a declining block program in which a centralized “Standard Buyer” would purchase residential solar at a rate set by the Commission.⁵⁴ The Standard Buyer would purchase solar at the rate set by the Commission until a pre-designated block of capacity was met, after which the price the Standard Buyer would drop to a lower rate. A regulatory decision was expected by the end of January 2016, but is still pending at time of writing.

<http://estar.kcc.ks.gov/estar/ViewFile.aspx/20150924104744.pdf?Id=29b7b55e-b40c-4f66-9335-153bfe44a81e>.

⁴⁹ Ibid, p. 44.

⁵⁰ The study estimated the value of distributed solar generation based on avoided energy costs, avoided generation capacity costs, avoided natural gas pipeline costs, solar integration costs, avoided transmission costs, avoided distribution costs, voltage regulation, net social cost of carbon, sulfur dioxide, and nitrous oxides, market price response, and avoided fuel price uncertainty. Maine Public Utilities Commission, “Maine Distributed Solar Valuation Study,” presented to The Joint Standing Committee on Energy, Utilities and Technology - 127th Main Legislature, March 1, 2015.

⁵¹ Ibid, p. 6.

⁵² Herman K. Trabish, “Maine Lawmakers Propose Groundbreaking Way out of Net Metering Wars,” Utility Dive, June 8, 2015, accessed February 5, 2016, <http://www.utilitydive.com/news/maine-lawmakers-propose-groundbreaking-way-out-of-net-metering-wars/400074/>.

⁵³ State of Maine 127th Maine Legislature, “Resolve, to Create Sustainable Growth in Maine’s Distributed Energy Sector that Uses Market Forces to Fairly Compensate Energy Producers,” HP 863, LD 1263, June 30, 2015, <http://legislature.maine.gov/legis/bills/getPDF.asp?paper=HP0863&item=3&snm=127>.

⁵⁴ State of Maine Office of the Public Advocate, “A Ratepayer Focused Strategy for Distributed Solar in Maine,” Strategen Strategies for Clean Energy, 2015, <http://www.maine.gov/meopa/news/Maine%20VOS%20White%20Paper%20V2%202.pdf>.

G. Minnesota (Status: Final Order)

In April 2014, Minnesota was the first state to approve an alternative to NEM through its Value of Solar Tariff (“VOST”).⁵⁵ In 2013, House Bill 729 (“HB 729”) required that the Minnesota Department of Commerce (“DOC”) develop a methodology for calculating the value of solar which included evaluating the value of energy as well as the costs and benefits of solar to utilities.⁵⁶ VOST is a type of buy-sell arrangement, where electricity bought by the customer is valued at the retail rate, while electricity sold back to the utility is priced at the value of solar.⁵⁷ Customer-generators under VOST are locked into a 25-year contract, the lifespan of a solar panel.⁵⁸ IOUs may voluntarily elect to use VOST with approval of the Minnesota Public Utilities Commission (“MPUC”); however, as of November 2015, no IOU had elected to implement the VOST in place of NEM.⁵⁹

On June 13, 2015, the Minnesota State Governor signed the 2015 Jobs and Energy Bill, approving a fixed charge for new customer-generators of municipal utilities and electric cooperatives.⁶⁰ This fixed charge is only applicable to new customer-generators with a facility capacity less than 40 kW. While the bill does not specify the magnitude of the charge for each individual utility, it stipulates that each utility may elect a charge that is “reasonable and appropriate for that class of

⁵⁵ Minnesota Public Utilities Commission, *Order Approving Distributed Solar Value Methodology*, Docket No. E-999/M-14-65, April 1, 2014, <https://www.edockets.state.mn.us/Efiling/edockets/searchDocuments.do?method=showPoup&documentId={FC0357B5-FBE2-4E99-9E3B-5CCFCF48F822}&documentTitle=20144-97879-01>; Herman K. Trabish, “Can Minnesota’s Value of Solar End the Net Metering Debate?” Utility Dive, April 11, 2014, accessed February 11, 2016, <http://www.utilitydive.com/news/can-minnesotas-value-of-solar-end-the-net-metering-debate/250451/>.

⁵⁶ “Value of Solar Tariff,” DSIRE, updated November 12, 2015, accessed February 11, 2016, <http://programs.dsireusa.org/system/program/detail/5666>.

⁵⁷ Herman K. Trabish, “Can Minnesota’s Value of Solar End the Net Metering Debate?” Utility Dive, April 11, 2014, accessed February 11, 2016, <http://www.utilitydive.com/news/can-minnesotas-value-of-solar-end-the-net-metering-debate/250451/>.

⁵⁸ Ibid; see also Minnesota Public Utilities Commission, *Order Approving Distributed Solar Value Methodology*, Docket No. E-999/M-14-65, April 1, 2014, p. 11, <https://www.edockets.state.mn.us/Efiling/edockets/searchDocuments.do?method=showPoup&documentId={FC0357B5-FBE2-4E99-9E3B-5CCFCF48F822}&documentTitle=20144-97879-01>.

⁵⁹ “Value of Solar Tariff,” DSIRE, updated November 12, 2015, accessed February 11, 2016, <http://programs.dsireusa.org/system/program/detail/5666>.

⁶⁰ State of Minnesota House of Representatives, “2015 Jobs and Energy Bill,” accessed February 11, 2015, https://www.revisor.mn.gov/bills/text.php?number=HF3&version=0&session=ls89&session_year=2015&session_number=1&format=pdf.

customer” given the most recent cost of service study. The additional charge is intended to allow utilities to recover fixed costs not already being recovered through the customer's current billing schedule. In addition to granting the fixed charge, the bill stipulates that customer-generators with less than 40 kW capacity may receive the "average retail utility energy rate" for their net input of electricity onto the grid. These changes became effective July 1, 2015 for customers installing NEM after that date.⁶¹

H. Mississippi (Status: Final Order)

On December 3, 2015, the Mississippi Public Service Commission unanimously voted on an approval for a net metering proposal.⁶² The approved proposal indicates that energy produced onto the grid from the customer-generator will be netted against the energy the customer-generator uses from the grid at the retail rate until the customer bill reaches net zero. At this point the customer-generator will be compensated at the wholesale avoided cost rate plus a \$0.025/kWh adder for additional excess energy produced onto the grid.⁶³ Entergy Corp. and Mississippi Power Company are additionally required to provide an added \$0.02/kWh to the first 1,000 low-income customers to install net-metered DG projects.⁶⁴ The IOUs are expected to adopt these changes in early 2016 while the utility cooperatives have nine months to comply with the new rule or propose their own net metering rules.⁶⁵

I. Nevada (Status: Final Order)

On June 5, 2015, Nevada's Governor signed Senate Bill 374 ("SB 374"), which establishes a framework for transitioning between the existing NEM rules ("NEM1") and new NEM rules ("NEM2").⁶⁶ Under NEM1, customer-generators are credited at the retail electricity rate for the electricity their systems supply to the grid. On July 31, 2015, Nevada Energy, holding company of

⁶¹ Ibid, p. 74-75.

⁶² Public Service Commission of the State of Mississippi, *Order and Adopting Metering Rule*, Docket No. 2011-AD-2, December 3, 2015.

⁶³ Ibid, p. 11-16.

⁶⁴ Dan Testa, "Balancing interest of utilities, solar, Miss. PSC approves net metering policy," SNL, December 4, 2015, accessed on February 1, 2016, <https://www.snl.com/InteractiveX/article.aspx?ID=35210449&KPLT=4>.

⁶⁵ Julia Pyper, "Mississippi Regulators Strive for Compromise with New Net Metering Rule," Greentech Media, December 7, 2015, accessed on February 1, 2016, <http://www.greentechmedia.com/articles/read/Mississippi-Regulators-Strive-for-Compromise-With-New-Net-Metering-Rule>.

⁶⁶ Nevada State Senate, *Senate Bill No. 374-Senator Farley: Revises provisions relating to energy*, BDR 58-800, June 5, 2016.

Nevada Power and Sierra Pacific Power, submitted an application to the Public Utilities Commission of Nevada requesting to approve new rules and rates for NEM2 customers, including a three-part rate that reflects the cost of providing standby service to NEM2 customers.⁶⁷

On December 22, 2015, the Public Utilities Commission of Nevada approved NV Energy's application of new NEM2 tariffs and established separate rate classes for NEM ratepayers.⁶⁸ However, instead of approving a three-part rate, the Commission approved a two-part tariff consisting of a modified basic service charge and a volumetric commodity charge.⁶⁹ In its decision, the Commission cited inequities between NEM ratepayers and non-NEM ratepayers as justification for creating separate rate classes for NEM customers. The Commission explained, "NEM ratepayers are under-paying, and the difference has to be collected from non-NEM ratepayers... if NEM ratepayers are not in separate rate classes. By placing NEM ratepayers in a separate rate class, the Commission can design rates that effectively collect those costs through an alternative rate structure."⁷⁰

Addressing net excess energy, the Commission stated, "Banking the net excess energy at the retail rate as some parties propose is not just and reasonable because the energy delivered by the NEM ratepayers is not the same as the energy delivered by NV Energy."⁷¹ Rather than the retail rate, the Commission ordered NV Energy to use the "average annual long-term avoided energy cost... from NV Energy's last approved integrated resource plan filings with an adder for avoided distribution line losses."⁷² Additionally, the Commission finds that the new NEM2 rate structure should also apply to NEM1 customers. The Commission does not believe it is appropriate to use NEM1 data to establish NEM2 rates and then not apply those same rates to NEM1 ratepayers.⁷³ However, NV Energy disagreed with the decision to not 'grandfather' in existing customers under the NEM1 tariff. In a February 5, 2016 filing, NV Energy said it supports a plan allowing about 27,000 existing solar customers to pay the old rate for twenty years.⁷⁴

⁶⁷ Public Utilities Commission of Nevada, *Application for Approval of Cost of Service Study and Net Metering Riders and Request for Interim Order*, Docket No. 15-07041, July 31, 2015.

⁶⁸ Public Utilities Commission of Nevada, *Order*, Docket No. 15-07041/Docket No. 15-07042, December 22, 2015.

⁶⁹ *Ibid*, p. 91-92.

⁷⁰ *Ibid*, p. 44.

⁷¹ *Ibid*, p. 94.

⁷² *Ibid*, p. 95.

⁷³ *Ibid*, p. 48.

⁷⁴ Daniel Rothberg, "NV Energy: Let existing solar customers keep old rate for 20 years," Intelligent Utility, February 5, 2016, accessed on February 8, 2016, http://www.intelligentutility.com/article/16/02/nv-energy-let-existing-solar-customers-keep-old-rate-20-years?utm_source=2016_02_08&utm_medium=eNL&utm_campaign=IU_DAILY&utm_content=69764

Lastly, consistent with the bill stability principle of rate design, the Commission outlined a time frame to gradually shift ratepayers to the revised NEM rate structure.⁷⁵

J. New York (Status: Pending)

On April 24, 2014, the state of New York released its Reforming Energy Revision (“REV”) initiative proposal which poses key utility questions and proposed five policy objectives that include: customer knowledge and tools for effective energy bill management, market animation and leverage of ratepayer contributions, system wide efficiency, fuel and resource diversity, and system reliability and resiliency.⁷⁶ One overarching goal of the initiative is to reform the business and regulatory functions of utilities and transform utilities into Distribution System Platform Providers (“DSPP”).⁷⁷ As DSPPs, utilities will continue operations of third-party owned energy generation, but will be also be functioning as facilitators of a network platform to coordinate a distribution network which will largely include energy input from customer-generators.⁷⁸ The initiative is expected to take roughly ten years before it is fully implemented.⁷⁹

The REV initiative proposes a revised ratemaking framework which will be derived from results from the valuation of grid service and DER.⁸⁰ The deadline for the valuation of DER is expected near the end of 2016.⁸¹ One of the more recent policy changes resulting from the REV valuation policy was the interim lift of net metering caps. On October 16, 2015, the New York Public Service Commission released an order which would lift the ceiling on the net metering cap, originally six percent of electric demand, until the REV valuation is complete due to utility expectations of increased net metered generation.⁸² No other major decisions are expected during 2016.⁸³

⁷⁵ Gradual shifts towards the revised rate structure are scheduled to occur on the first of January in 2016, 2017, 2018, 2019, and 2020; *Ibid*, pp. 96-97.

⁷⁶ “Reforming the Energy Vision,” NYS Department of Public Service Staff Report and Proposal, Case No. 14-M-0101, April 24, 2014, p. 1.

⁷⁷ *Ibid*, p. 11.

⁷⁸ “New York’s REV: Seeking a Greener Utility Grid for the Environment and Investors,” Moody’s Investor Service, p. 3.

⁷⁹ *Ibid*, p. 4.

⁸⁰ “Reforming the Energy Vision,” NYS Department of Republic Service Staff Report and Proposal, Case No. 14-M-0101, April 24, 2014, p. 3.

⁸¹ Krysti Shallenberger, “10 State Rooftop Solar Debates to Watch in 2016 and Beyond,” Utility Dive, January 25, 2016, accessed on January 29, 2016, <http://www.utilitydive.com/news/10-state-rooftop-solar-debates-to-watch-in-2016-and-beyond/412087/>.

⁸² State of New York Public Utilities Commission, *Order Establishing Interim Ceilings on the Interconnection of the Net Metered Generation*, Case No. 15-E-0407, October 16, 2013.

K. Oklahoma (Status: Pending)

In April 2014, Oklahoma passed Senate Bill 1456 (“SB 1456”), which allows regulated utilities to charge customer-generators a separate rate, effective November 2014. The Senate introduced the act to address subsidy issues prevalent in the DG marketplace, and the act does not apply to customers who installed solar panels prior to November 2014.⁸⁴ Utilities are required by law to have supporting tariffs filed, approved, and implemented by January 1, 2016. In August 2015, Oklahoma Gas and Electric (“OG&E”) filed an application before the Corporation Commission of Oklahoma to approve a new DG tariff in compliance with SB 1456. The proposed three-part tariff includes a customer charge of \$18.00/month, a demand charge of \$2.68/kW-month, an on-peak energy charge of \$0.173/kWh, and an off-peak energy charge of \$0.0137/kWh.⁸⁵

L. South Carolina (Final Order)

In June 2014, South Carolina’s General Assembly passed Act 236 which outlined solar policy in the state.⁸⁶ Act 236 requires that utilities make NEM available to all customers on a first-come, first-serve basis until the generating capacity of the NEM system is equal to “two percent of the previous five-year average of the electrical utility’s South Carolina retail peak demand.”⁸⁷ The Act also requires that regulators approve a Value of Solar (“VOS”) methodology that utilities can use to value DER and develop DG rates.⁸⁸ Additionally, Act 236 also permits solar leasing or third party ownership (“TPO”) of rooftop solar. This Act applies to the state’s IOUs, including the two largest utilities: South Carolina Electric and Gas and Duke Energy. Publicly-owned utilities, such as South Carolina Public Service Authority

⁸³ Krysti Shallenberger, “10 State Rooftop Solar Debates to Watch in 2016 and Beyond,” Utility Dive, January 25, 2016, accessed on January 29, 2016, <http://www.utilitydive.com/news/10-state-rooftop-solar-debates-to-watch-in-2016-and-beyond/412087/>.

⁸⁴ Oklahoma State Legislature, *Senate Bill 1456*, April 15, 2014, <http://www.oklegislature.gov/BillInfo.aspx?Bill=sb1456&Session=1400>.

⁸⁵ Corporation Commission of the State of Oklahoma, *Direct Testimony of Roger D. Walkingstick on behalf of Oklahoma Gas and Electric Company*, Cause No. 201-500274, July 31, 2015, p. 18.

⁸⁶ South Carolina General Assembly 120th Session, *Act No. 236*, June 2, 2014, http://www.scstatehouse.gov/sess120_2013-2014/bills/1189.htm.

⁸⁷ *Ibid*, Section 58-39-130(C).

⁸⁸ Herman K. Trabish, “Is South Carolina solar about to explode?” Utility Dive, November 18, 2014, accessed February 2, 2016, <http://www.utilitydive.com/news/is-south-carolina-solar-about-to-explode/334164/>.

("Santee Cooper"), are exempt from several conditions under the legislation because they do not fall under direct regulation from the South Carolina Public Service Commission.⁸⁹

In August 2015, the Santee Cooper Board approved an interim installed capacity fee, called a Grid Access Charge ("GAC") through April 1, 2016. The GAC ranges between \$4.20 and \$4.70/kW-month of installed DG capacity.⁹⁰ On December 7, 2015, Santee Cooper's Board authorized a two-year rate adjustment effective in 2016 and 2017. Under the adjustment, customer-generators will now be subject to a monthly fixed charge of \$2.00, a monthly stand-by charge of \$4.40/kW of installed capacity, and energy charges as set forth in the applicable rate schedule.⁹¹ In addition, customer-generators are compensated for their excess output at a rate of \$0.0389/kWh during the summer and \$0.0381/kWh during winter. Lastly, Santee Cooper stated on October 16, 2015 that it would also include rebates of \$0.65/watt for residential customers who want to purchase solar panels for their homes, provide an additional \$0.03/kWh of compensation for excess energy produced to the grid for the first 500 residential customers who sign up, and establish a community solar project for customers who cannot install rooftop solar.⁹²

M. Texas (Status: Pending/Completed)

The El Paso Electric Company ("EPE") applied for a series of rate changes on August 10, 2015 which are pending approval from the Public Utilities Commission of Texas ("PUC").⁹³ Among these rate changes are an increase in residential monthly fixed charges for standard

⁸⁹ Santee Cooper is regulated by a board of directors appointed by the governor and confirmed by the state senate. Herman K. Trabish, "As IOUs Push Solar, Santee Cooper Rate Plan Draws Ire of South Carolina Greens," Utility Dive, December 7, 2015, accessed February 2, 2016, <http://www.utilitydive.com/news/as-iou-push-solar-santee-cooper-rate-plan-draws-ire-of-south-carolina-gre/410305/>.

⁹⁰ Interim Distributed Generation Rider (Retail) RIDER DG-15, South Carolina Public Service Authority, p. 1-3, <https://www.santeecooper.com/pdfs/rates/distributed-generation/interim-dg-rider-dg-15.pdf>.

⁹¹ South Carolina Public Service Authority Rate Schedules Effective for Bills Rendered on or after April 1, 2016, South Carolina Public Service Authority, December 7, 2015, accessed on February 2, 2016, <https://www.santeecooper.com/pdfs/about-santee-cooper/rates/2016/2016-and-2017-final-rates.pdf>.

⁹² "Santee Cooper Board approves solar incentive package," Santee Cooper press release, October 16, 2015, <https://www.santeecooper.com/about-santee-cooper/news-releases/news-items/santee-cooper-board-approves-solar-incentive-package.aspx?ht>.

⁹³ Public Utility Commission of Texas, *El Paso Electric Company's Petition and Statement of Intent to Change Rates*, Docket No. 44941, August 10, 2015, http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/44941_2_861533.PDF.

residential and residential customer-generators.⁹⁴ Residential customer-generators would also be subject to a demand charge, but a decreased volumetric rate. EPE has also proposed the creation of a new solar customer class. While El Paso's City Council has unanimously rejected the proposal, the decision from the PUCT is still pending and is expected in early 2016.

Southwestern Public Service Company ("SPS"), a subsidiary of Xcel Energy, applied for an increase to its fixed charges in December 2014.⁹⁵ A year later in December 2015, the PUCT approved the fixed charge increase for residential customers from \$7.60/month to \$9.50/month.⁹⁶ SPS's Distributed Generation Interconnection Tariff is identical to the "tariff for applicable class or service" customer-generators with a generating capacity of 100 kW or less, indicating that the residential fixed charge rate increase also applies to residential customer-generators within the 100 kW capacity level.⁹⁷

N. Wisconsin (Status: Final Order)

Approved by the Wisconsin Public Service Commission in December 2014, We Energies offers a mandatory net metered rate to residential customers with less than 300 kW of installed generation capacity.⁹⁸ The rate consists of a fixed charge of about \$1.82/month in addition to a residential facilities charge of \$16.04/month,⁹⁹ with additional energy charges determined by the customer's otherwise applicable tariff schedule.¹⁰⁰ The monthly capacity charge of \$3.794/kW was removed

⁹⁴ Herman K. Trabish, "El Paso Council Rejects Texas Utility's Proposal to Create Solar Customer Class," Utility Dive, December 10, 2015, accessed February 5, 2016, <http://www.utilitydive.com/news/el-paso-council-rejects-texas-utility-proposal-to-create-solar-customer-c/410578/>.

⁹⁵ Public Utilities Commission of Texas, *Order*, Docket No. 43695, December 18, 2015, http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/43695_1018_876737.PDF.

⁹⁶ *Ibid*, p. 54.

⁹⁷ Electric Tariffs: Distributed Generation Interconnection, Xcel Energy – Southwestern Public Service, Section No. IV, Sheet No. IV-159, p. 3 of 23, http://www.xcelenergy.com/staticfiles/xcel/Regulatory/Regulatory%20PDFs/rates/TX/tx_sps_e_entire.pdf.

⁹⁸ Public Service Commission of Wisconsin, *Final Decision*, Docket No. 5-UR-107, December 23, 2014.

⁹⁹ The total monthly fixed charge is the daily generation facilities charge plus a DG rider multiplied by 30.5 days. This calculation is $(\$0.05951/\text{day} \times 30.5 \text{ days}) + (\$0.52602/\text{day} \times 30.5 \text{ days}) = \$1.82/\text{month} + \$16.04/\text{month}$. \$0.52602/day from Residential Service tariff. Residential Service - Rate Schedule Rg 1, We Energies, http://www.we-energies.com/pdfs/etariffs/wisconsin/ewi_sheet21.pdf.

¹⁰⁰ Customer Generating Systems – Net Metered (CGS NM) Less than 300 KW - Rate Schedule CGS NM, We Energies, http://www.we-energies.com/pdfs/etariffs/wisconsin/ewi_sheet2016-2018.pdf.

from the tariff as a result of a court order in October 2015.¹⁰¹ The company credits net energy supplied by the customer using a Buy-Back Energy Rate which is either based on a flat rate or TOU rate dependent on the residential customer's otherwise applicable tariff schedule.

Madison Gas and Electric Company ("MGE") also received approval by the Commission in December 2014 for an increase in residential fixed charges.¹⁰² The \$19.00/month residential rate,¹⁰³ up from \$10.44/month, is composed of a customer charge of \$14.97/month and a grid connection service charge of \$4.03/month.¹⁰⁴ According to the Commission, the MGE fixed charge increase would realign costs more appropriately with fixed charges, rather than variable charges.¹⁰⁵ MGE compensates customers' excess energy at the appropriate retail rate unless they are net energy sellers for over 12 months.

In addition to the above recent fixed charge decisions, the Wisconsin Public Service Corporation ("WPS") has also received two separate fixed charge rate increases in the last two years for residential customers.¹⁰⁶ The Commission approved the increased fixed charges "to better align the charge with fixed costs of providing service, regardless of the amount of energy used."¹⁰⁷ The Commission stated that they "continue to support customers who want to own their own generation; however, the Commission also has an obligation to those customers who do not want to or who cannot afford to own generation to make sure these customers are not subsidizing the costs for those who choose to and are able to own their own generation."¹⁰⁸ Customer-generators

¹⁰¹ Krysti Shallenberger, "10 State Rooftop Solar Debates to Watch in 2016 and Beyond," Utility Dive, January 25, 2016, accessed on January 29, 2016, <http://www.utilitydive.com/news/10-state-rooftop-solar-debates-to-watch-in-2016-and-beyond/412087/>.

¹⁰² Public Service Commission of Wisconsin, *Final Decision*, Docket No. 3270-UR-120, December 23, 2014.

¹⁰³ MGE's approved fixed charge increase applies to all standard residential customers and is not specific to customer generators; Residential Service – Schedule Rg-1 and Residential Time-of-Use Rate – Schedule Rg-2, Madison Gas and Electric, <https://www.mge.com/Images/PDF/Electric/Rates/ElecRates.pdf>.

¹⁰⁴ Public Service Commission of Wisconsin, *Final Decision*, Docket No. 3270-UR-120, December 23, 2014, p. 35.

¹⁰⁵ *Ibid*, p. 36.

¹⁰⁶ WPS's approved fixed charge increase applies to all standard residential customers and is not specific to customer generators.

¹⁰⁷ Public Service Commission of Wisconsin, *Final Decision*, Docket No. 6690-UR-123, December 18, 2014, p. 42.

¹⁰⁸ *Ibid*, p. 44.



Edison Electric
INSTITUTE

Power by Association™

are currently credited at weighted average rate, dependent on peak generation, in addition to \$0.00831/kWh for the excess energy they supply to the grid.¹⁰⁹

¹⁰⁹ Parallel Generation – Net Energy Billing – Schedule PG-4, Wisconsin Public Service Corporation, http://www.wisconsinpublicservice.com/company/wi_tariffs/PG4.pdf.



Table 1: Summary of Proposed and Accepted Distributed Generation Rates by State

			Demand Charges	Buy-Sell	Fixed Charge	Capacity Charge	Installed Capacity Fee	DG Output Fee	Inter-Connection Fee	Minimum Bill	Standby Rates	TOU Energy Charges	Grand-fathering	DG-Specific
[1]	Arizona	Arizona Public Service	X	X	X		✓					X	Yes	Yes
[2]	Arizona	Salt River Project	✓		✓							✓	Yes	Yes
[3]	Arizona	UNS Energy Corporation	✓	✓	✓								Yes	Yes
[4]	California	Investor-Owned Utilities	X	✓	X	X	X		✓			✓	Yes	Yes
[5]	Hawaii	Hawaiian Electric Company		✓						✓			Yes	Yes
[6]	Illinois	Statewide	✓											
[7]	Kansas	Westar Energy	X		X								Yes	Yes
[8]	Maine	Statewide		✓										Yes
[9]	Minnesota	Statewide		✓	✓								Yes	Yes
[10]	Mississippi	Statewide		✓										Yes
[11]	Nevada	Nevada Energy	X	✓	✓							✓	No	Yes
[12]	New York	Statewide												
[13]	Oklahoma	Oklahoma Gas and Electric	✓		✓							✓	Yes	Yes
[14]	South Carolina	Investor-Owned Utilities		✓										Yes
[15]	South Carolina	Santee Cooper		✓	✓		✓						No	Yes
[16]	Texas	El Paso Electric Company	✓		✓									Yes
[17]	Texas	Southwestern Public Service Co.			✓									No
[18]	Wisconsin	Madison Gas and Electric			✓								No	No
[19]	Wisconsin	We Energies		✓	✓		X						Yes	Yes
[20]	Wisconsin	Wisconsin Public Service Corp.		✓	✓									No

Note: This is drawn from utility-specific summaries in Section IV of this report. Each utility rate offering is unique and may not correspond exactly with the categories defined above.

Key:

- ✓ Approved
- ✓ Proposed (decision pending)
- X Proposed & rejected or withdrawn



Bibliography

- “APS Asks to Reset Grid Access Charge for Future Solar Customers.” APS press release, April 2, 2015. Accessed on July 20, 2015.
<https://www.aps.com/en/ourcompany/news/latestnews/Pages/aps-asks-to-reset-grid-access-charge-for-future-solar-customers.aspx>.
- “APS’s Proposal to Change Net-Metering.” ASU Energy Policy Innovation Council, updated December 2013. Accessed February 1, 2016. https://energypolicy.asu.edu/wp-content/uploads/2013/12/APS-Net-Metering-Brief-Sheet-Draft--Final_updated-Dec-2013.pdf.
- Arizona Corporation Commission. *Application*, Docket No. E-04204A-15-0142, May 5, 2015, https://www.uesaz.com/doc/UNSE_Rate_Application.pdf.
- Arizona Corporation Commission. *Order Rescinding Decision No. 75251, Dismissing APS’s Motion to Reset and Closing Docket No. E-01345A-13-0248*, Docket No. E-01345A-13-0248, October 27, 2015.
- Bonbright, James C., Albert L. Danielsen and David R. Kamerschen, “Principles of Public Utility Rates, 2nd Edition”, Public Utilities Reports (March , 1988)
- Brown, Ashley and Jillian Bunyan, “Valuation of Distributed Solar: A Qualitative View”, *The Electricity Journal*, December 2014, Vol. 27, Issue 10
- California State Assembly, *Assembly Bill No. 327*, October 7, 2013, http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB327.
- Caves, Douglas, Laurits Christensen and Joseph Herriges. “Modeling Alternative Residential Peak-Load Electricity Rate Structures.” *J. Econometrics*, 1984.
- Consumers for Smart Solar. *Constitutional Amendment Petition Form: Rights of Electricity Consumers Regarding Solar Energy Choice*, Serial No. 15-17, July 21, 2015.
- Corporation Commission of the State of Oklahoma. *Direct Testimony of Roger D. Walkingstick on behalf of Oklahoma Gas and Electric Company*, Cause No. 201-500274, July 31, 2015.
- Customer Generating Systems – Net Metered (CGS NM) Less than 300 KW - Rate Schedule CGS NM. We Energies. http://www.we-energies.com/pdfs/etariffs/wisconsin/ewi_sheet2016-2018.pdf.
- Customer Grid Supply and Self Supply Programs. HECO. <https://www.hawaiianelectric.com/clean-energy-hawaii/producing-clean-energy/customer-grid-supply-and-self-supply-programs>.
- Electric Tariffs: Distributed Generation Interconnection. Xcel Energy – Southwestern Public Service. http://www.xcelenergy.com/staticfiles/xcel/Regulatory/Regulatory%20PDFs/rates/TX/tx_sps_entire.pdf.



Faruqui, Ahmad, and Ryan Hledik. "An Evaluation of SRP's Electric Rate Proposal for Residential Customers with Distributed Generation." Prepared for Salt River Project, January 2015. Accessed February 3, 2016.

<http://www.srpnet.com/prices/priceprocess/pdfx/DGRateReview.pdf>.

Harelson, Scott. "SRP Board Approves Reduced Price Increases." Salt River Project press release, February 26, 2015. Accessed on July 1, 2015.

<http://www.srpnet.com/newsroom/releases/022615.aspx>.

"HB 3328/SB1879 Offers a Comprehensive Plan for Illinois' Energy Future." Commonwealth Edison news release, March 19, 2015. Accessed July 27, 2015.

https://www.comed.com/newsroom/pages/newsroomreleases_03192015.pdf?FileTracked=true.

Linville, Carl, John Shenot and Jim Lazar. "Designing Distributed Generation Tariffs Well." Prepared for the Regulatory Assistance Project, November 2013.

Illinois General Assembly. "Bill Status of SB1879." Accessed February 5, 2016.

<http://www.ilga.gov/legislation/BillStatus.asp?DocNum=1879&GAID=13&DocTypeID=SB&SessionID=88&GA=99>.

Illinois General Assembly. "Bill Status of HB3328." Accessed February 5, 2016,

<http://www.ilga.gov/legislation/BillStatus.asp?DocTypeID=HB&DocNum=3328&GAID=13&SessionID=88&LegID=89510>.

Interim Distributed Generation Rider (Retail) RIDER DG-15. South Carolina Public Service Authority.

<https://www.santeecooper.com/pdfs/rates/distributed-generation/interim-dg-rider-dg-15.pdf>.

Lockwood, Barbara. "Residential Demand Charges." Presentation at NARUC Annual Meeting, 2015.

Minnesota Public Utilities Commission. *Order Approving Distributed Solar Value Methodology*, Docket No. E-999/M-14-65, April 1, 2014,

<https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={FC0357B5-FBE2-4E99-9E3B-5CCFCF48F822}&documentTitle=20144-97879-01>.

Maine Public Utilities Commission. "Maine Distributed Solar Valuation Study." Presented to The Joint Standing Committee on Energy, Utilities and Technology - 127th Main Legislature, March 1, 2015.

Nevada State Senate. *Senate Bill No. 374-Senator Farley: Revises provisions relating to energy*, BDR 58-800, June 5, 2016.

"New York's REV: Seeking a Greener Utility Grid for the Environment and Investors." Moody's Investor Service.

Oklahoma State Legislature. *Senate Bill 1456*, April 15, 2014,

<http://www.oklegislature.gov/BillInfo.aspx?Bill=sb1456&Session=1400>.



- Parallel Generation – Net Energy Billing – Schedule PG-4. Wisconsin Public Service Corporation. http://www.wisconsinpublicservice.com/company/wi_tariffs/PG4.pdf.
- Public Utilities Commission of Nevada. *Application for Approval of Cost of Service Study and Net Metering Riders and Request for Interim Order*, Docket No. 15-07041, July 31, 2015.
- Public Utilities Commission of Nevada. *Order*, Docket No. 15-07041/Docket No. 15-07042, December 22, 2015.
- Public Utility Commission of Texas. *El Paso Electric Company's Petition and Statement of Intent to Change Rates*, Docket No. 44941, August 10, 2015, http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/44941_2_861533.PDF.
- Public Utilities Commission of Texas. *Order*, Docket No. 43695, December 18, 2015, http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/43695_1018_876737.PDF.
- Public Service Commission of the State of Mississippi. *Order and Adopting Metering Rule*, Docket No. 2011-AD-2, December 3, 2015.
- Public Service Commission of Wisconsin. *Final Decision*, Docket No. 5-UR-107, December 23, 2014.
- Public Service Commission of Wisconsin. *Final Decision*, Docket No. 3270-UR-120, December 23, 2014.
- Public Service Commission of Wisconsin. *Final Decision*, Docket No. 6690-UR-123, December 18, 2014.
- Public Utilities Commission of the State of California. *Decision Adopting Successor to Net Energy Metering Tariff*, Rulemaking 14-07-02, January 28, 2016.
- Public Utilities Commission of the State of Hawaii. *Final Statement of Position of the Hawaiian Electric Companies*, Docket No. 2014-0192, June 29, 2015.
- Public Utilities Commission of the State of Hawaii. *Hawaiian Electric Companies' Motion for Approval of New Program Modification and Establishment of Transitional Distributed Generation Program Tariff*, Docket No. 2014-0192, January 20, 2015.
- Pyper, Julia. "Mississippi Regulators Strive for Compromise with New Net Metering Rule." Greentech Media, December 7, 2015. Accessed on February 1, 2016. <http://www.greentechmedia.com/articles/read/Mississippi-Regulators-Strive-for-Compromise-With-New-Net-Metering-Rule>.
- "Reforming the Energy Vision." NYS Department of Public Service Staff Report and Proposal, Case No. 14-M-0101, April 24, 2014.
- Residential Service - Rate Schedule Rg 1. We Energies. http://www.we-energies.com/pdfs/etariffs/wisconsin/ewi_sheet21.pdf.
- Residential Service – Schedule Rg-1 and Residential Time-of-Use Rate – Schedule Rg-2. Madison Gas and Electric. <https://www.mge.com/Images/PDF/Electric/Rates/ElecRates.pdf>.



“Rights of Electricity Consumers Regarding Solar Energy Source 15-17.” Florida Department of State Division of Elections.

<http://dos.elections.myflorida.com/initiatives/initdetail.asp?account=64817&seqnum=1>.

Rothberg, Daniel. “NV Energy: Let existing solar customers keep old rate for 20 years.”

Intelligent Utility, February 5, 2016. Accessed on February 8, 2016.

http://www.intelligentutility.com/article/16/02/nv-energy-let-existing-solar-customers-keep-old-rate-20-years?utm_source=2016_02_08&utm_medium=eNL&utm_campaign=IU_DAILY&utm_content=69764

Stokke, Andreas, Gerard Doorman and Torgeir Ericson. “An Analysis of a Demand Charge Electricity Grid Tariff in the Residential Sector.” Discussion Paper 574, Statistics Norway Research Department, January 2009.

“Santee Cooper Board approves solar incentive package.” Santee Cooper press release, October 16, 2015. <https://www.santeecooper.com/about-santee-cooper/news-releases/news-items/santee-cooper-board-approves-solar-incentive-package.aspx?ht>.

Shallenberger, Krysti. “10 State Rooftop Solar Debates to Watch in 2016 and Beyond.” Utility Dive, January 25, 2016. Accessed on January 29, 2016. <http://www.utilitydive.com/news/10-state-rooftop-solar-debates-to-watch-in-2016-and-beyond/412087/>.

“SRP Standard Electric Price Plans: Salt River Project Agricultural Improvement and Power District, Temporary Prices Effective November 2015 – April 2016 Billing Cycle.” Salt River Project, October 6, 2015. Accessed February 3, 2016.

<http://www.srpnet.com/prices/priceprocess/pdfx/April2015RatebookPUBLISHED.pdf>.

St. John, Jeff. “California Net Metering 2.0 Keeps Retail Rates for Rooftop Solar.” Greentech Media, December 15, 2015. Accessed February 5, 2016.

<http://www.greentechmedia.com/articles/read/breaking-california-net-metering-2.0-keeps-retail-rates-for-rooftop-solar>.

State Corporation Commission of the State of Kansas. *Application of Westar Energy Volume II Minimum Filing Requirements*, Docket No. 15-WSEE-115-RTS, March 2, 2015,

<http://estar.kcc.ks.gov/estar/ViewFile.aspx/S20150302143551.pdf?Id=74e4c4cf-8c4d-4f30-95cc-59ce1417777b>.

State Corporation Commission of the State of Kansas. *Direct Testimony of Ahmad Faruqui on behalf of Westar Energy*, Docket No. 15-WSEE-115-RTS, 2015,

[https://www.westarenergy.com/Portals/0/Resources/Documents/RateCasePDF/Direct Testimony of Ahmad Faruqui on behalf of Westar Energy.pdf](https://www.westarenergy.com/Portals/0/Resources/Documents/RateCasePDF/Direct%20Testimony%20of%20Ahmad%20Faruqui%20on%20behalf%20of%20Westar%20Energy.pdf).

State Corporation Commission of the State of Kansas. *Order Approving Stipulation and Agreement*, Docket No. 15-WSEE-115-RTS. September 24, 2015,

<http://estar.kcc.ks.gov/estar/ViewFile.aspx/20150924104744.pdf?Id=29b7b55e-b40c-4f66-9335-153bfe44a81e>.

State of Maine 127th Maine Legislature. “Resolve, to Create Sustainable Growth in Maine’s Distributed Energy Sector that Uses Market Forces to Fairly Compensate Energy Producers,”



HP 863, LD 1263, June 30, 2015,

<http://legislature.maine.gov/legis/bills/getPDF.asp?paper=HP0863&item=3&num=127>.

State of Maine Office of the Public Advocate. “A Ratepayer Focused Strategy for Distributed Solar in Maine.” Strategen Strategies for Clean Energy, 2015.

<http://www.maine.gov/meopa/news/Maine%20VOS%20White%20Paper%20V2%202.pdf>.

State of Minnesota House of Representatives. “2015 Jobs and Energy Bill.” June 13, 2015.

Accessed February 11, 2015,

https://www.revisor.mn.gov/bills/text.php?number=HF3&version=0&session=ls89&session_year=2015&session_number=1&format=pdf.

State of New York Public Utilities Commission. *Order Establishing Interim Ceilings on the Interconnection of the Net Metered Generation*, Case No. 15-E-0407, October 16, 2013.

South Carolina General Assembly 120th Session. *Act No. 236*, June 2, 2014,

http://www.scstatehouse.gov/sess120_2013-2014/bills/1189.htm.

South Carolina Public Service Authority Rate Schedules Effective for Bills Rendered on or after April 1, 2016. South Carolina Public Service Authority, December 7, 2015.

<https://www.santeecooper.com/pdfs/about-santee-cooper/rates/2016/2016-and-2017-final-rates.pdf>.

Taylor, Thomas, and Peter Schwartz. “A Residential Demand Charge: Evidence from the Duke Power Time-of-Day Pricing Experiment.” *Energy Journal* 7(2) (April 1986): pp 135–151.

Taylor, Thomas N. “Time-of-Day Pricing with a Demand Charge: Three-Year Results for a Summer Peak.” *Award Papers in Public Utility Economics and Regulation*, Michigan State University Institute of Public Utilities, Michigan, 1982.

Taylor, Mike, Joyce McLaren, Karlynn Cory, Ted Davidovich, John Sterling and Miriam Makhyoun. “Value of Solar: Program Design and Implementation Considerations.” NREL Technical Paper NREL/TP-6A20-6236.1, 2015.

Testa, Dan. “Balancing interest of utilities, solar, Miss. PSC approves net metering policy.” SNL, December 4, 2015. Accessed on February 1, 2016.

<https://www.snl.com/InteractiveX/article.aspx?ID=35210449&KPLT=4>.

Trabish, Herman K. “As IOUs Push Solar, Santee Cooper Rate Plan Draws Ire of South Carolina Greens.” *Utility Dive*, December 7, 2015. Accessed February 2, 2016.

<http://www.utilitydive.com/news/as-iou-push-solar-santee-cooper-rate-plan-draws-ire-of-south-carolina-gre/410305/>.

Trabish, Herman K. “Can Minnesota’s Value of Solar End the Net Metering Debate?” *Utility Dive*, April 11, 2014. Accessed February 11, 2016. <http://www.utilitydive.com/news/can-minnesotas-value-of-solar-end-the-net-metering-debate/250451/>.

Trabish, Herman K. “El Paso Council Rejects Texas Utility’s Proposal to Create Solar Customer Class.” *Utility Dive*, December 10, 2015. Accessed February 5, 2016.

<http://www.utilitydive.com/news/el-paso-council-rejects-texas-utilitys-proposal-to-create-solar-customer-c/410578/>.



- Trabish, Herman K. "Is South Carolina solar about to explode?" Utility Dive, November 18, 2014. Accessed February 2, 2016. <http://www.utilitydive.com/news/is-south-carolina-solar-about-to-explode/334164/>.
- Trabish, Herman K. "What's Solar Worth? Inside Arizona Utilities' Push to Reform Net Metering Rates." Utility Dive, June 1, 2015. Accessed July 28, 2015. <http://www.utilitydive.com/news/whats-solar-worth-inside-arizona-utilities-push-to-reform-net-metering-r/399706/>.
- Trabish, Herman K. "Maine Lawmakers Propose Groundbreaking Way out of Net Metering Wars." Utility Dive, June 8, 2015. Accessed February 5, 2016. <http://www.utilitydive.com/news/maine-lawmakers-propose-groundbreaking-way-out-of-net-metering-wars/400074/>.
- "UES Seeks New Electric Rates to Reflect Higher Costs." UniSource Energy Services. Accessed on July 10, 2015. <https://www.uesaz.com/news/updates/e-rates/>.
- "Unisource Energy Service Seeks Approval of New Electric Rates to Better Reflect Customers' Use of its Upgraded Utility System." UniSource Energy Services press release, May 5, 2015. Accessed on July 10, 2015. <https://www.uesaz.com/news/newsroom/release/index.php?idRec=342>.
- "Value of Solar Tariff." DSIRE, updated November 12, 2015. Accessed February 11, 2016, <http://programs.dsireusa.org/system/program/detail/5666>.
- Walton, Robert. "AZ Regulatory Staff Rejects Solar Net Metering Changes outside Full Rate Case." Utility Dive, June 12, 2015. Accessed on July 20, 2015. <http://www.utilitydive.com/news/az-regulatory-staff-rejects-solar-net-metering-changes-outside-full-rate-ca/400656/>.