

*Net Metering in the States:
Moving Toward Equitable and Sustainable
Policies for Electric Customers*

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Executive Summary

A growing controversy surrounds how certain customers are compensated for the energy that they generate via residential solar panels. The traditional method of compensating such customers is called net metering (NEM), where utilities pay consumer-generators for electricity at the “retail rate” or end-point price charged to customers.

Over the past decade, residential electric customers across the country have installed rooftop solar panels, or photovoltaic (PV) residential systems on their homes or at their property. There are numerous reasons electricity consumers choose to do so, from lucrative tax incentives and lower energy costs to environmental concerns and reduced energy usage.

The dramatic fall in the price of solar energy generation systems and years of federal, state, and local subsidies and tax incentives for installing residential PV panels has contributed to the rapid growth in rooftop solar in the United States.

But in recent years, rooftop solar has been thrust into the state regulatory spotlight, bringing great attention -- and confusion -- to a consumer’s otherwise personal decision.

The result is that NEM unfairly subsidizes solar power-generating consumers by transferring their share of the costs of grid and infrastructure maintenance and investment to non-generating consumers. Since the compensated “retail rate” per kilowatt hour is greater than the actual value of the power itself, non-generating consumers pay higher and higher energy costs to offset the excessive payments made to generating customers.

This study concludes that NEM policies should be reformed, finding that:

- Most recent studies do not show net benefits for subsidizing consumer power generation through net metering pricing. Public benefits can often be achieved at less cost
- Net metering represents a significant cost shift from generating to non-generating consumers, raising the overall price of electricity generation, distribution, and transmission.
- Net metering policies are deeply regressive, benefiting the well-off self-generating consumer at the expense of poorer non-generating consumers.
- Utility investors and non-generating consumers are being unfairly disadvantaged, paying a large subsidy to generating consumers. NEM compensation structure does not benefit the grid’s reliability or reduce overall consumer costs.

Overall, net metering compensation models are not a sustainable nor consumer-friendly means to encourage renewable energy self-generation by consumers. The harm to other consumers, the reliability of the grid, and the economy outweighs the isolated benefits accrued by the individual rooftop solar consumer-generator. State policymakers, both legislators and regulators should reform NEM practices.

Introduction

What is Net Metering?

Net metering, dating back to the early 1980s, is a utility billing mechanism that pays customers with rooftop solar (or other distributed generation) for the electricity that they self-generate and/or any electricity they wish to sell back to the grid.

Under NEM, a customer's electric meter is "rolled back" based on the amount of electricity they generate at their home. A customer with rooftop solar panels, under traditional retail rate net metering, would pay the retail price of electricity for the power they purchase from the electric company, but their bill would then be reduced by the retail price of the electricity they generated on-site.

Providing electricity to homeowners and businesses entails four components: making the electricity (generation), moving the electricity (transmission), delivering the electricity (distribution) and miscellaneous and overhead for social programs (for example, the costs of programs to support low-income customers or promote other policy goals, such as efficiency). Historically, electricity was generated at large power plants that were built to capture economies of scale, sent through transmission lines, and then distributed to homes and businesses.

To understand the economics of net metering billing policies, it is useful to understand that several new technologies, like solar photovoltaic (PV), benefit from economy of scope—not scale. Factory mass production is the key to cost reduction. As a result, PV costs have come down rapidly.

Merely looking at the costs of solar panels, though, only tells part of the story of expanding distributed generation (DG). Each rooftop panel that is installed requires investment in the common electric grid to be effective. Customers with solar panels (or other DG facilities) can draw electricity from the utility when their panels do not provide sufficient power for their needs (i.e., night time, overcast days, high usage on site, etc.) and sell excess electricity back to the utility when panels generate more than is immediately needed. This changes operation of the distribution network, and occasionally the transmission grid, by creating a two-way power flow, rather than the historical configuration for one-way flow.

What is the Problem?

Historically utility rates have been set to include all costs of service: generation, transmission, and distribution. The latter two are the delivery cost representing 'the grid' while the former is the commodity and represents power plants. Typically, rate setting involved estimating the total revenue requirements for each type of costs, summing those costs and dividing by the forecast total volume to be bought by and delivered to customers. Customers were concerned only with the delivered total cost, and that was charged by a single entity, the utility.

Today, most American households pay for electric service via a two-part electric rate. This typically consists of a fixed customer charge (\$ per month) and an energy rate applied per unit of consumption (\$ per kilowatt hour). There are some variations including rates that vary based on time of day, or highest demand level (\$/kW.) In recent years, utilities and regulators have proposed significant changes in rate structure to address the changing dynamics of the electricity industry,

such as aggressive energy efficiency, self-generation and net metering.

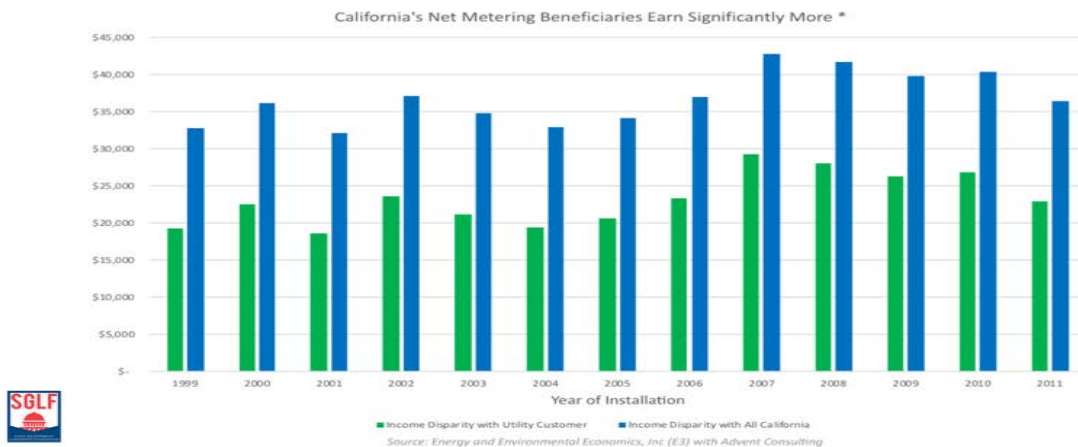
As with energy efficiency, net metering can lead to under collection of fixed costs, such as for grid maintenance that are not dependent on volume delivered. Just as rates structures have changed to accommodate fixed costs under energy efficiency programs, many states are recognizing they must change rate structures in response to net metering. However, increasing fixed charges tends to reduce the natural incentive to increase economic efficiency.

Cost Shifting

When utilities are required to purchase DG power at retail rates without accounting for infrastructure costs, a subsidy from non-net metered customers to net metered customers -- a cost shift -- occurs. Purchasing electric generation in effect compensates those customers for the transmission and distribution services they are actually relying on to export their energy. Thus, paying retail rates for this output is unreasonable. Utilities have a historic agreement with state regulatory agencies to serve *all* their customers at just and reasonable rates. This agreement has been turned on its head into a mandate to buy power at unjust and unreasonable rates under NEM. One issue remains-- what is a fair and equitable price to pay customer-generators for their output. That is not a trivial matter, and the issue grows exponentially with more net metering.

Regressivity

Beyond mere cost-shifting, net metering can be regressive and disproportionately impact low-income customers. Many studies have found that owners of rooftop solar are more affluent than those without rooftop solar. In three Commission-backed studies¹ (in California, Nevada, and



¹ Energy and Environmental Economics, Inc (E3), "Introduction to the California Net Energy Metering Ratepayer Impacts Evaluation," Prepared by California Public Utilities Commission Energy Division, October 28, 2013; E3, "Evaluation of Hawaii's Renewable Energy Policy and Procurement," Prepared for Hawaii Public Utilities Commission, January 2014 (Revision); <https://puc.hawaii.gov/wp-content/uploads/2013/04/HIPUC-Final-Report-January-2014-Revision.pdf> ; E3, "Nevada Net Energy Metering Impacts Evaluation," Prepared for Nevada Public Utilities Commission, July 2014; http://puc.nv.gov/uploadedFiles/pucnv.gov/Content/About/Media_Outreach/Announcements/Announcements/E3%20PUCN%20NEM%20Report%202014.pdf

Hawaii), the consulting firm E3 found income disparities between rooftop solar customers and the rest of the residential class. As shown in the chart, E3 (for the California PUC) found that the median income of rooftop solar customers was roughly \$90,000 per year. That is almost twice the state's median income of \$54,000 per year. Another report for the Louisiana Public Service Commission (LPSC) by Acadian Consulting Group found that rooftop solar customers within the LPSC's jurisdiction had median household incomes of \$60,460 relative to the statewide median household income level of only \$44,673 relative to the statewide median household income level of only \$44,673.²

But there is still worse news. Those same beneficiaries of favorable net metering policies receive additional benefits through tax credits at state and federal level. For example, certain taxpayers can claim a federal tax credit of 30% for a residential solar system.³ In addition, customers in Colorado can receive incentive payments of \$100/kW for their solar installation. Customers in Florida are given relief on property tax assessments, which can be significant.

Incentives Upon Incentives

Net metering is itself a hefty payment to owners of rooftop solar. We have already established that, by and large, those customers tend to be wealthier than other customers. Given these facts, it is also worth exploring what other financial incentives these customers are getting at the expense of taxpayers.

A 2016 study conducted by the Consumer Energy Alliance (CEA) tallied the federal and state incentives (including NEM) available to rooftop solar customers. What they found was stunning. In the 15 states they studied, CEA discovered that rooftop solar customers can get as much as 100 percent of the value of their entire solar system in eight states and subsidies covering three-quarters of the cost of a solar system costs in another seven states. It is worth noting that the study also found that utility-scale solar, which is by far the most efficient form of solar power, can only get a subsidy covering about 58 percent of the cost of the system.⁴

Evaluating Net Metering: What Regulators and Legislators Need to Know

The Trouble with Cost/Benefit Studies

There are a number of ways to evaluate the impact of net metering. One such method is cost-benefit analysis, which attempts to quantify the social costs and benefits associated with providing net metering compensation for customers with private generation. Traditionally, these studies are done by calculating the difference between any benefits (that is, the costs that a utility *avoids* as a

² Acadian Consulting Group for the Louisiana PSC, "In re: Examination of the Comprehensive Costs and Benefits of Net Metering in Louisiana" September 2015.

³ While this federal tax credit was initially at risk of being cut in the recent tax reform bill, the final tax legislation maintains the current phase-down schedule for the solar investment tax credit (ITC). The current ramp-down of the ITC extends through the end of 2021. (See: CNBC, "Renewable energy and electric vehicles dodge a bullet in tax bill," December 22, 2017; <https://www.cnbc.com/2017/12/22/renewable-energy-and-electric-vehicles-dodge-a-bullet-in-tax-bill.html>)

⁴ Consumer Energy Alliance, *Incentivizing Solar Energy: An In-Depth Analysis of U.S. Solar Incentives*, 2016.; <https://consumerenergyalliance.org/cms/wp-content/uploads/2016/09/Solar-incentive-report-FINAL.pdf>

result of net-metered customers) and any new costs created by those customers.

While cost-benefit studies are frequently conducted both by external parties and at the request of state regulators, systemic problems abound in attempting to estimate the economic value of net metering. Studies are only as good as their assumptions and inputs. Unfortunately, there are many ways in which cost-benefit analyses can be poor reflections of reality. For example, a cost-benefit study with overly pessimistic future fuel price projections will have substantially higher calculated benefits through the assumed ‘avoided’ costs associated with power generation.

Additionally, cost-benefit studies are often skewed by the inclusion of elements that should not factor into the evaluation of net metering, such as non-energy benefits and speculative values.

These elements—often included without much assessment or verification—are most often seen in “studies” that are trying to prove outsized benefits of net metering. An honest evaluation of existing studies reveals that properly conducted cost-benefit analysis can be done. And when it is, the results show net costs, not net benefits.

In the ongoing debate about net metering, there is a vocal group that wishes to promote a particular perspective about the benefits of rooftop solar. Many so-called studies that are frequently referenced either have no quantitative rigor or, worse, are meta-studies that cherry pick from a subset of the literature to prove a particular point.

In her critique of a Brookings article on net metering, Lisa Wood, a nonresident Senior Fellow at Brookings and lead at the Institute for Electricity Innovation, noted: “In reviewing NEM studies, Muro and Saha [authors of the original Brookings article] chose to focus on a handful of studies that show that net metering results in a benefit to all customers, to the exclusion of studies showing the opposite.”⁵

A good example of Woods’ critique is the ongoing citation of a cost-benefit report that the firm E3 conducted for the Nevada utility commission. Wood explains, “[t]he original report came out in 2013, but very soon after the study was published, the cost assumptions for the base-case scenario—which showed a net benefit of \$36 million to non-NEM customers (assuming \$100 per MWh for utility-scale solar)—were found to be incorrect, completely reversing the conclusion. In E3’s updated report, issued in 2016, the original \$36 million net benefit associated with NEM for private rooftop solar turned into a \$222 million cost to non-NEM customers when utility-scale solar was priced at \$80 per MWh.”⁶ Yet, despite the update based on verifiable cost data, the 2013 report is still touted by proponents of net metering. This particular case speaks to a larger point in that studies of benefit and costs are extremely sensitive and should not be relied on very heavily in setting public policy.

Matching Policy Goals with Policy Tools

Perhaps the biggest question when it comes to cost-benefit analysis is: When should it be used?

⁵ Lisa V. Wood, “Why net energy metering results in a subsidy: The elephant in the room,” Brookings Institution, June 13, 2016; <https://www.brookings.edu/opinions/why-net-energy-metering-results-in-a-subsidy-the-elephant-in-the-room/>

⁶ Ibid; “Why net energy metering results in a subsidy: The elephant in the room.”

The answer is rarely—and only once other methods of evaluation have been exhausted. There are other ways to evaluate the impact of net metering that are cheaper, more efficient, and better suited to making decisions about public policy.

It is important to remember that net metering itself is not a public policy objective. Yet it is often cited as a way to achieve particular policy ends. Policymakers and regulators are tasked with deciding policy objectives. For energy and electricity issues, those objectives might be a reduction in carbon emissions, improvements in reliability, or greater penetration of renewable energy. In each of these cases, policymakers should ask themselves: what is the lowest cost and most efficient method is to achieve the desired end goal?

If the policy goal is to encourage solar energy development, policy makers should heed the warnings of Richard Schmalensee. Schmalensee, the Howard W. Johnson Professor of Management Emeritus and Professor of Economics Emeritus at MIT and former director of the MIT Center for Energy and Environmental Policy Research spoke to this point in his comments to DOE in response to a Request for Information on net metering. In 2015, he directed MIT’s multidisciplinary study *The Future of Solar Energy*, to “assess solar energy’s current and potential competitive position and to identify changes in U.S. government policies that could more efficiently and effectively support the industry’s robust, long-term growth.” He made two points relevant to the costs and benefits of net energy metering (NEM). First, although distributed (or residential) solar energy *can* bring benefits to home-owners and communities, it is not the most economically efficient way to achieve environmental goals – it costs too much for the benefits delivered. Second, NEM, widely used by states as an incentive to increase deployment of residential solar, presents serious problems – it is unfair. The bottom line is that NEM is the most costly and inefficient means to encourage solar development and hence actually impedes its growth.

Recent Federal & State Level Activity: Options for Moving Beyond Net Metering

State regulators and legislators interested in moving beyond traditional net metering have a number of recent (and quality) examples. Below we try to draw lessons from a select group of states and lay out some of the policy pathways that can be explored in efforts to find more meaningful and equitable policies than NEM.

Federal

The U.S. Congress has directed the U.S. Department of Energy (DOE or Department), as part of the Grid Modernization Initiative, to conduct a study of the cost and benefit considerations of net metering to utilities (utility business perspective), ratepayers (consumer perspective), and the electrical grid (technical/operational perspective). There have been numerous studies assessing the impacts of net metering in states across the United States, some of which are discussed herein. DOE is currently seeking stakeholder input on existing studies (2012-present) assessing the costs and benefits of net metering, and the availability of data that can be used in conducting such studies. DOE expects to use this input to help inform its report to Congress.⁷ As of February 2018,

⁷ The Federal Register, “Costs and Benefits of Net Energy Metering: Request for Information,” September 15, 2017; <https://www.federalregister.gov/documents/2017/09/15/2017-19647/costs- and-benefits-of-net-energy- metering-request-for-information>

it is unclear how DOE is going to address net metering, but their focus on the policy and the way that it is evaluated reflects the broader consensus to focus more on outcomes that favor all customers rather than on favoring specific classes or technologies.

States in Focus

A state-level discussion of net metering reform efforts is crucial information for policy makers and regulators as such efforts provide important exemplars of the recognition that existing NEM policies are no longer serving all customers.

Arizona

The debate in Arizona was very contentious, with warring factions arguing for and against increases to NEM amounts and rates. The debate has been decided in favor of all customers. In 2016 the Arizona Corporation Commission (ACC) decided to reform its export rates — what the utilities pay solar users for excess energy -- to reduce the cost-shift to non-solar ratepayers. They held a two-day hearing that adjourned after almost 30 hours of public testimony. The vote of 4-1 to implement significant changes to the export rates were only one piece of the change. Solar advocates claimed that this could devastate the rooftop-solar industry in the state. Around 30 groups took part in the deliberations, including solar advocates Vote Solar and The Alliance for Solar Choice, along with electric co-operatives, and the state's utilities.

According to PV Magazine, the bruising battle seemed as if it would go on forever, even after the ACC ordered an evidentiary hearing in November 2015 to determine the value of solar based on discussions between the groups involved. That excruciating process led to a vote to treat NEM customers as a separate class, seemingly putting to rest once and for all questions about the future of net-metering in Arizona. The “value of DG” proceeding set the stage for rate case filings by the utilities.⁸

The article went on to note that the decision declared that distributed-generation (DG) rooftop solar customers are considered a separate class of customers, with their status to be determined in each individual utility rate case moving forward, subject to a “fully vetted cost-of-service analysis” conducted by the utilities; establishes the resource-comparison proxy (RCP) -- essentially the cost of utility-scale solar — as the basis for the initial DG export rate in rate-cases currently being adjudicated by the commission, with export rates in future cases being determined either by the RCP method, the avoided-costs method (ACM) or a combination of both.

In June 2016, Arizona Public Service (APS) proposed an increase in its residential monthly fixed charge. The rate case proposes three rate options for residential customers (as well as a fourth option available only to customers with very low consumption). Two of the options include a fixed charge of \$24.00, and the other includes a fixed charge of \$14.51. Each of the three options includes time-of-use rates, reflecting the time value of generation. A settlement agreement among 30 parties, including major solar advocacy groups, was filed in March 2017. The agreement includes four rate options for residential DG customers: two three-part rates with \$13 fixed

⁸ Frank Andorka, “Arizona’s changes to net metering could derail the state’s rooftop solar market,” PV Magazine, December 20, 2016; <https://pv-magazine-usa.com/2016/12/20/arizonas-changes-to-net-metering-could-derail-the-states-rooftop-solar-market/>

charges, a time-of-use rate with a \$13 fixed charge, and a pilot three-part rate for DG customers with a \$15 fixed charge. In May, the Arizona Corporation Commission staff filed a brief concluding that the settlement should be adopted. The decision was issued in September 2017.⁹

Indiana

In May 2017, Indiana Gov. Eric Holcomb signed into law SB 309 that lowers the retail rate for NEM customers and ultimately phases out retail net metering. Senate Bill 309 went through many revisions since it was first introduced, with lawmakers first including then scrapping a controversial "sell-all, buy-all" provision. They also grandfathered systems installed by the end of 2017 under the retail rate for 30 years, but the rate will be lowered over a series of years for other customers after 2022. After 2022 customers with generation installed will be compensated at utility's marginal cost plus 25%.¹⁰ This strikes a balance of sorts between existing NEM customers who acted based on then-existing policies, yet corrects the policy going forward.

Kansas

The Kansas Corporation Commission issued an order in September 2017¹¹ directing utilities to establish separate rates for customers with rooftop solar generation, to avoid having their use of the electric grid subsidized by other customers. The regulators adopted a multi-party agreement among participants in the docket which was opened the prior year when KCC began the investigation into distributed generation rates. The KCC decision allows Westar, one of the major utilities in Kansas to file new rates that will likely be higher for distributed generation customers; other utilities will be allowed to assess new fees as well.

The order states that utilities "may establish a separate rate class and propose new rate design for distributed generation customers to ensure those customers share in the fixed costs of the electric grid and are not subsidized by other ratepayers."¹² Customers with distributed generation systems operating prior to new tariffs being implemented will be allowed to remain on their existing rates until 2030.

Kentucky

Kentuckians are concerned about the unfairness of existing net metering policy in their state and are implementing fixes through legislation. The Kentucky House Natural Resources Committee has advanced a bill that would harmonize Kentucky's solar net metering rates with rates charged other customers. Under house bill 227, the buyback rates will be reduced from the retail price of power to the wholesale price – a reduction of about two-thirds – making new net metering customers pay their share of infrastructure costs.

The legislation is supported by utility companies, fuel suppliers, and consumer advocates who are

⁹ Arizona Corporation Commission, Opinion on Ratemaking, Docket no. E-01345A-16-0036, September 19, 2017; <http://images.edocket.azcc.gov/docketpdf/0000182797.pdf>

¹⁰ Robert Walton, "Indiana Will Phase Out Retail Rate Net Metering" Utility Dive, May 4, 2017, <https://www.utilitydive.com/news/indiana-will-phase-out-retail-rate-net-metering/441932/>

¹¹ Kansas Corporation Commission, "KCC provides guidance on rate design for distributed generation customers," September 21, 2017; <http://www.kcc.state.ks.us/news-9-21-17>

¹² Ibid.

concerned about the inherent regressivity of further subsidizing high income net metering homeowners.

Before the Committee's vote of approval, the bill had twice been on the committee's agenda but never received a vote. Committee Chairman Jim Gooch added three members to the committee because absences had prevented the committee from having a quorum. He's predicted that the full House would vote on the bill now that it's passed committee.

Rep. Brian Linder voted for the bill, saying the net metering program didn't benefit people in his district. "You see, it takes over \$20,000 to install solar and my middle-class people in my district can't afford that. And they end up subsidizing the people in Lexington and Louisville."

There are fewer than 1,000 private net metered customers in Kentucky out of more than 2.2 million utility customers (not counting those served by TVA). Nearly half of the net meters in Lexington and Louisville. While those existing customers will be grandfathered under the old rates, any future net-metered solar growth without HB 227 would shift more costs onto other customers.¹³ The current subsidy represents perhaps \$50,000 annually,¹⁴ so Kentucky seems ready to fix the problem before it grows too damaging to customers.

Maine

In early 2017, Maine became the fourth state to more appropriately compensate net metering. The Public Utilities Commission adopted a ramp-down policy, which gradually harmonizes the transmission and distribution charges for net metering customers, aligned with true avoided costs. The rules grandfather existing customers for 15 years.

In June 2017, the state legislature passed a bill making significant changes to Maine's DG compensation policy, which the Governor then vetoed in early July. The law prohibits utilities from assessing fees for transmission or distribution (T&D) service relating to energy or demand supplied by customer self-generation. The bill also prohibits utilities from requiring customers to meter the gross output of eligible facilities in order to participate in net metering and requires net metering customers to be billed based on "net energy," which is defined as the difference between the kWh delivered by the utility and exported by the customers during the billing period.¹⁵ It is unclear how net energy metering accounts for time differentiated value of energy and capacity, but as noted next, this is considered an issue needing resolution.

The change would again allow behind-the-meter consumption of energy produced by customer-owned systems. The proposed legislation directs the Public Utilities Commission to amend the state's net metering rules by January 1, 2018 to implement these new provisions and allow 100% of eligible customers' net energy to apply to their T&D charges until December 31, 2021. The Commission's recently revised rules gradually reduce the percentage of net energy able to offset T&D charges. The bill also directs the PUC to submit a report to a standing committee of the

¹³ Tyler White, "Time Is Up For Solar Subsidies Pushed By The Elite, Anti-Coal Activists", Lexington Herald Leader, Feb, 13, 2018, <http://www.kentucky.com/opinion/op-ed/article199898684.html>

¹⁴ Author's estimate, based on data from U.S Department of Energy, available at <https://www.eia.gov/electricity/data/eia861m/>

¹⁵ North Carolina Clean Energy Technology Center, The 50 States of Solar: Q2 2017 Quarterly Report, July 2017.

legislature by January 1, 2021 and include recommendations for transitioning from net metering to time-varying rates, market-based rates, or other rate designs. (This would closely mirror what is now done in Arizona.)

New Hampshire

In June 2017, the New Hampshire Public Utilities Commission issued a decision in the state's net metering replacement tariff proceeding adopting a new tariff structure that largely retains net metering but assigning responsibility for non-bypassable charges to grid imports, as well as a reduced net excess generation credit rate. The new tariff retains customer behind-the-meter consumption and monthly netting, but delineates certain charges (system benefits charge, stranded cost recovery charge, storm recovery charge, and the state electricity consumption tax) as non-bypassable. These charges, amounting to approximately 0.388 cents/kWh, will be applied to all kWh delivered by the utility to the customer. The successor also includes a reduced rate for monthly net excess generation. This shows that net metering policy reform should center on rates and shared responsibilities. Importantly, the changes allow grandfathering of customers who acted based on then existing policy.

Nevada

Somewhat overshadowing Nevada's debate regarding net metering is "Question 3" a statewide ballot initiative to restructure the utility industry. Under claims of increasing competition, Question 3 would eliminate the utility monopoly and impose customer choice but would likely remove the monopsony position of utilities as purchasers of excess generation from NEM customers. The exact structure of the electric industry is left to the Nevada legislature in the event Question 3 passes. The impact to net metering is unclear, but likely disruptive.

In mid-2017, the Nevada state legislature revised the state's net metering policy, enacting legislation that increases the credit for excess generation from avoided cost to 95% of the retail rate. This rate will decrease over time as certain installed capacity thresholds are reached. The Nevada Public Utilities Commission held a series of public hearings in April. The Legislation, SB392, was vetoed by the Governor and returned to the 2019 Legislative session.¹⁶

North Carolina

In June 2017, the North Carolina legislature passed H.B. 589. making significant changes to the state's solar policies. The bill authorizes solar leasing in certain utility territories (Duke Energy and participating municipal utilities) and allows utilities to lease systems to customers. Further, the bill orders the state's public utilities to file revised net metering rates considering the costs and benefits of net metering (See comments on page 7 regarding benefit cost analysis.) The North Carolina legislature began assessing net metering with the bill's approval. The state does not currently require utilities to offer net metering.

The bill directs the NCUC to set rates that are non-discriminatory and that ensure that net metering customers pay their full share of fixed costs and may include fixed monthly energy and demand

¹⁶ Nevada State Legislature, "Senate Bill 392," 79th Session (2017); <https://www.leg.state.nv.us/App/NELIS/REL/79th2017/Bill/5450/Overview>

charges. Existing net metering customers (as of the date the NCUC adopts a new tariff) are grandfathered with current net metering tariffs until January 1, 2027.¹⁷ Rapid solar growth encouraged Duke Energy to push for reform of the state's approach to PURPA (avoided cost) and allow the utility to participate in competitive bidding against solar developers. The proposal met opposition from solar advocates, who said it would slow their sector's growth (but not social benefits of solar.) Parties settled on a measure designed to ensure future solar growth at rates more amenable to Duke and its customers. Results included lowering the state's avoided cost rate but keep in the 20-year length for power purchase agreements

South Carolina

Perhaps presaging a repeat of Arizona's contentious debate, two conflicting bills that are moving through the South Carolina legislature illustrate that state's struggle with the expansion of solar energy. The House Labor Commerce and Industry Committee overwhelmingly approved a bill that could make it more expensive for homeowners to run solar panels on their rooftops. The bill, which sailed through the committee, eventually would eliminate cost shifts that favor homeowners that install solar panels. Hours later, a separate House committee voted through a bill intended to remove a cap on installations, while allowing for possible expansion. The House Judiciary Committee voted 18-5 to lift a four-year-old cap on solar power. Unless the cap is lifted, people no longer would be able to install solar panels at affordable rates in the future. The existing cap could be reached in the next year.

South Carolinian newspaper, *The State*, notes the contrasting votes show the division among lawmakers over solar energy and sets up a showdown in the House of Representatives that could determine the future of net metering in South Carolina.¹⁸ Customers are caught in the middle. Will the Legislature decide for all customers or just those willing and able to afford net metering installations? They may want to take the two-step approach successful in Arizona.

In addition to the above states, others – Arkansas, Michigan, Montana, and Idaho, to name a few – are evaluating or actively seeking to revamp or replace net metering.

*Note on Income Disparity Chart

Energy and Environmental Economics, Inc (E3) with the assistance of Advent Consulting, analyzed the incomes of NEM customers and compared that to the 2010 income of average customers of investor owned utility and compared that to the average Californian. Each year of NEM installation between 1999 and 2011 was compared. The analysis was based on census tracts from the 2010 US Census since census tracts tend to have homogenous income demographics. All income levels represent 2010 income, but the disparity varies from year to year as homes in different census tracts, hence different 2010 incomes, installed NEM.

¹⁷ North Carolina Clean Energy Technology Center, "The 50 States of Solar: Q2 2017 Quarterly Report," July 2017.

¹⁸ Sammy Fretwell, "Utility Friendly Politicians Take Aim At Solar Expansion In SC", *The State*, (Updated) March 7, 2018, <http://www.thestate.com/news/local/article203713334.html>

Summary, Conclusions, and Recommendations

Current net metering (NEM) policies should be reformed in such a way that electricity rates are set fairly and reasonably for both customers and utility investors. As rooftop solar and other DG systems become more widely used, net metering policies and rate structures should be periodically updated so that everyone who uses the electric grid helps pay to sustain its smooth and reliable operation.

This approach ensures that all customers have safe and reliable electricity and that electric rates are fair and affordable for all customers, while providing appropriate incentive to invest in necessary electrical power generation and grid infrastructure.

Regarding NEM, this study recommends that state legislators and utility regulators:

- 1) Support the reform of net metering to enhance market equity, efficiency, and cost-effectiveness.
- 2) Promote policies—and advocate for analytic efforts—based on the principles of cost effectiveness and cost efficiency rather than less meaningful and often-flawed benefit/cost or so-called ‘value’ studies. Any public policy implemented based on such ‘value’ studies should be temporary (consistent with contract principles) and flexible, recognizing these studies’ inherent uncertainty.
- 3) Ensure just and equitable ratemaking based on true cost of service and transition away from bundled ratemaking altogether. Ratemaking policies should be technology and consumer-type neutral and instead seek to maximize the benefits to all consumers with reliable, affordable service.
- 4) Make greater use of time of use pricing for generation, transmission, and distribution.
- 5) Continually update analyses and refine policy responses with changes in underlying goals and/or circumstances that led to initial adoption of a given policy.

About the Author

Tom Tanton is the Director of Science and Technology Assessment for E&E Legal. He is also president of T2 & Associates, a firm providing services to the energy and technology industries. T2 & Associates are primarily active in renewable energy and interconnected infrastructures, analyzing and providing advice on their impacts on energy prices, environmental quality, and regional economic development.

Tanton has 40 years of direct and responsible experience in energy technology and legislative interface, having been central to many of the critical legislative changes that enable technology choice and economic development at the state and federal level. Mr. Tanton is a strong proponent of free market environmentalism and consumer choice, and frequently publishes and speaks against alarmist and reactionary policies and government failures.

Until 2000, Tanton was the Principal Policy Advisor with the California Energy Commission (CEC) in Sacramento, California. He began his career there in 1976, developing and implementing policies and legislation on energy issues of importance to California, the U.S. and International markets. These included electric restructuring, gasoline and natural gas supply and pricing energy facility siting and permitting, environmental issues, power plant siting, technology development, and transportation. Tanton completed the first assessment of environmental externalities used in regulatory settings. He has held primary responsibility for comparative economic analysis, environmental assessment of new technologies, and the evaluation of alternatives under state and federal environmental law.

As the General Manager at EPRI, from 2000 to 2003, Tanton was responsible for the overall management and direction of collaborative research and development programs in electric generation technologies, integrating technology, market infrastructure, and public policy. From 2003 through 2007, Tanton was Senior Fellow and Vice President of the Houston based Institute for Energy Research. He was also a Senior Fellow in Energy Studies with the Pacific Research Institute until 2010.

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